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THE IRON AGE

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THE IRON AGE

JUNE 10, 1937

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Politics Makes Strange Bedfellows

MR. JOHN LEWIS, head of the C.I.O., deplores the recent killing of five members of the mob which marched upon the Chicago works of the Republic Steel Corp. and which refused to halt when so ordered by constituted authorities. He calls this "murder."

Every other well-principled citizen of this country, including the police of Chicago and the executives of the company concerned, also deplores the use of force to prevent anarchy. But they will not call it murder.

If Mr. Lewis would care for a real example of cold blooded murder, he might go back, in memory, to the morning of June 22, 1922. On that morning some fifty members of the Steam Shovel Men's Union, with which the United Mine Workers, headed by John Lewis, were at odds, were brought out of the strip mine of the Southern Illinois Coal Co. under a flag of truce. They had been promised safe conduct to their homes.

Before they could entrain, however, they were lined up against a barbed wire fence, faced with a semi-circle of some 500 armed union miners. Fire was opened upon the little defenseless group of fifty and before the smoke had cleared away, 19 of them were dead and 30 wounded.

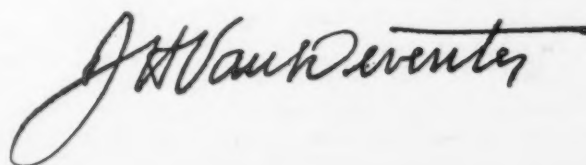
The victims had broken no law but they had committed the unpardonable crime of refusing allegiance and tribute to Lewis and his United Mine Workers.

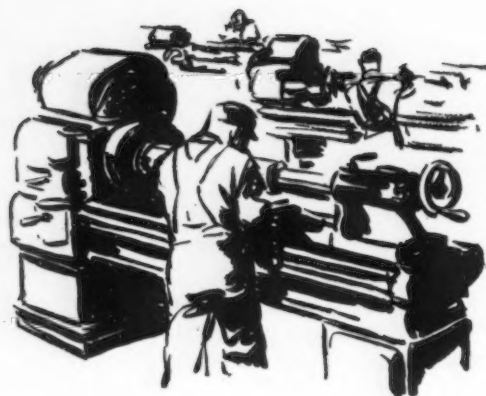
Of that atrocious massacre, inspired by mob rule, one eloquent speech of condemnation was made by a man well known to every American. Here is what he said:

"But a few weeks ago, in southern Illinois, as atrocious a massacre occurred as is contained in our annals. Men were killed, not cleanly killed, but brutally killed, and up to the time in which I speak, there is no shadow of a conviction of the murderers in sight.

"A blot of this kind on our escutcheon can be wiped out in but one manner and one manner only, and that is by due process of law. If we are to exist as a nation, we must be law-abiding. On the law depends our society. Destroy law and the country reverts to barbarism over night. Destroy law and we will be back in the days of slavery, rapine and pillage, when the strong oppress the weak, when interest triumphs over honor. Without law, our civilization crumbles. Our government is arranged in such fashion that it provides a method whereby we who compose it can change it."

This condemnation of mob rule was made at the Elk's convention in Atlantic City in 1922, and by none other than Franklin D. Roosevelt, then Assistant Secretary of the Navy.





Machine Tools

IN this article, from an address at the Machine Tool Speed Show held by the General Electric Co. at Cincinnati, May 24, Mr. Berna pays tribute to the teamwork of the electrical industry and suggests a few points of further cooperative development. In return, he points to some fundamental services that machine tool builders can render in furnishing

equipment that will enable the electrical industries to meet the lower costs entailed in higher wages and shorter hours.

He also points out that shorter working hours and higher wages have followed naturally from the use of more efficient machine tools and have not come as a consequence of legislation.

o o o

THE builders of electric motors and control and the builders of machine tools have proved themselves a very effective team. The machine tool builders got a head-start of about 100 years but in the past few years you have caught up with us and the cooperation between the two industries has been most effective.

We are particularly grateful to you for the development of the modern alternating-current motor, which will run for an indefinite length of time with very little attention. Furthermore, the development of standardized motor frames has been of great assistance to the machine tool builder, as it has given him interchangeability between the different makes of motor that he has to mount on his machine and has eliminated a good deal of changing and fitting on the assembly floor.

Control, too, has become more compact and more convenient and we now can select from the stand-

ards available types that are specially suited to each kind of machine tool.

Still Some Worlds to Conquer

However, there are still some worlds left to conquer. We still have to find a better way of keeping cutting oil out of our conduits and to protect our control against cast iron dust. Perhaps, too, we should give some thought to making our push buttons larger so that a man with a glove can operate them and more rugged so that a man who hits the button with a pair of pliers or a wrench will not do any particular harm.

There is also room for improvement in the dimension from the bottom of motor feet to center of shaft, which is a dimension of very great importance to the machine tool builder, and which at the moment is only held to a tolerance of 1/32 in. There are quite a number of machine tool builders who would be very happy to cooperate

with you in holding that dimension to closer tolerances, by furnishing you with machines upon which this can readily be done on a production basis.

With due acknowledgment of the service that you have rendered to the machine tool industry, may we also suggest that there is a service that we can render you. That better manufacturing equipment will reduce your costs, make it possible for you to work to closer tolerances, enable you to pay higher wages and work shorter hours. There is now, and there has always been only just that one way to accomplish these desirable things whether we build motors or mattresses.

Higher Wages and Shorter Hours Through Increased Efficiency

There is a tendency among human beings, and it has not been distinctive of any one group or even of any one nation, to accomplish reform by legislation. If we agree that the 8-hr. day and the elimination of child labor are desirable ends, why not simply enact laws that will make these things obligatory? It takes so long to educate the majority and so many of them are indifferent even to these laudable causes. But when our legislation runs counter to the fundamental laws of nature, it becomes a dead letter, as we had ample opportunity to find out when we tried to enforce prohibition. We are now trying to find short cuts that will permit higher wages and shorter hours without increasing the output for each worker by increasing the efficiency of our plants, or by improving our equip-

And Prosperity . . .

By TELL BERNA

*General Manager, National Machine
Tool Builders' Association, Cleveland*

ment, but this method runs counter to all of human experience and will probably fail.

About a hundred years ago the development of the reaper, and the gradual opening up of good farm land, gave the American farmer surplus crops which he could sell for cash, and made it possible for him to begin to buy those things which he had been making for himself, laboriously, on the farm. Simultaneously the demand for machine tools developed and the industry became of increasing importance as the demand for machinery increased in the industrial centers of the country. Hanging in the office of the Brown & Sharpe Mfg. Co., Providence, R. I., is a schedule of working hours, which was written by Mr. Lucien Sharpe, the founder of Brown & Sharpe, when he was employed at the Providence Machine company's plant in the winter of 1847-48. During most of the months work began at sunrise, but in May, June and July the worker was allowed to idle in bed until the atrociously late hour of 4:55 a.m. He stopped for breakfast at 6:30 and went back to work at ten minutes after seven and the day continued until 6:45 in the evening, with 55 minutes off for lunch in the middle of the day. The total hours per week varied somewhat as the time of the sunrise changed in the different parts of the year, but the minimum hours per week were 62½, the maximum 77.4.

Shorter Work Week Not Result of Legislation

That is in sharp contrast with present conditions. We are prac-

tically standardized on a 40-hour week. The important thing to realize is that this change has not come about by legislation. In 1899, long before the 8-hour day was legally required, the average hours per week in this country were 55. Here then is a substantial reduction from the day of Lucien Sharpe. By 1920 the average hours per week in this country had become 48 hours, by 1930 the average was 44 hours and today it is practically 40 hours a week. The important point is that this improvement was effected, not by legislation, but by giving the worker better equipment which made it economically possible for him to earn a living wage while working shorter hours.

It would be a simple matter to show that this change ran parallel with another equally important change and that was in the real value of the wages paid to the worker. These were increased, again not by legislative fiat, but by the increased earning power of the worker, due to the better equipment which we gave him, or, if you please, because of the increase in horse-power per worker during these years.

In contrast to this perfectly healthy development toward lower hours and higher wages, we have the arbitrary restriction of output by union regulations which is familiar to us all in the building trades. These trades did not wait for improved methods, improved materials, and better equipment to make it economically possible to reduce working hours and increase wages. They reduced them arbitrarily and the net result has been



TELL BERNA

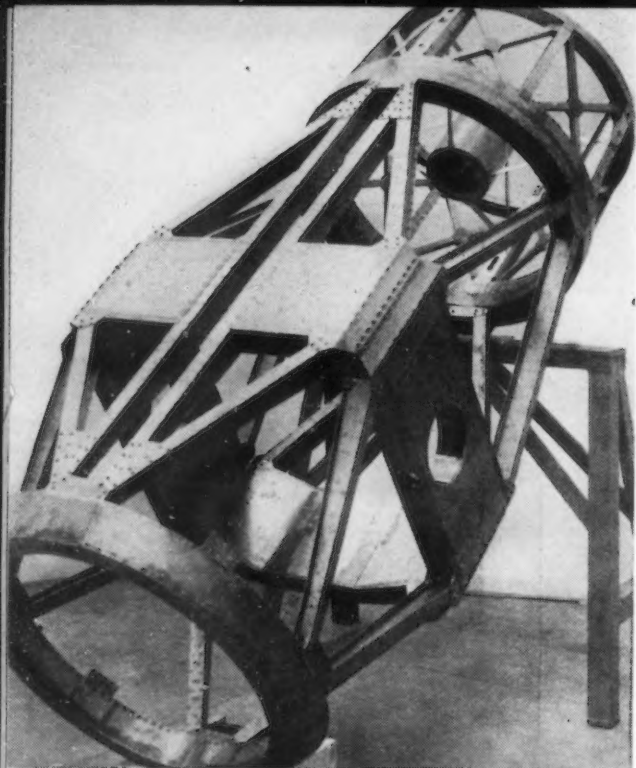
to choke the building industry and force us to live in obsolete antiquated houses because the cost of new construction is entirely out of line with the development of the country in other fields.

Machine Tools Contribute to Higher Living Standards

The machine tool has also served the nation by making possible lower costs and that, in turn, means increased markets and the consequent enrichment of human life by making it possible for us to have in our homes as everyday necessities the things that our grandfathers would have considered luxuries, or would not have had available at any price.

We are a little inclined to overlook the fact that the modern machine tool does not require as high a degree of skill on the part of the individual workman. Accuracy is built into the machine and in the measuring instruments which the worker uses to check the product of the machine. A hundred years ago a worker with little training was helpless, because everything had to be done by hand and even the products of the elementary machine tools of that day had to be corrected by skilled artisans who did this work by hand.

This means that we can open our factory doors to these semi-skilled men and to some who have practically no skill at all and enable them to earn high wages in the operation of machines. The
(CONTINUED ON PAGE 96)



MODEL of tube member, consisting of a main central section, a mirror cell at the lower end, and a prime focus cage at the upper end.

Machining and Assembling of Parts for World's Largest Telescope

By GEORGE P. PASSMORE

Manufacturing Superintendent, Westinghouse Electric & Mfg. Co., South Philadelphia Works

THE telescope mounting here referred to is that for the optical system of the 200-in. telescope to be erected at Mt. Palomar, Cal. Complete, the telescope will weigh more than 1,000,000 lb.

Of the two main members comprising the mounting, namely the "tube" and its supporting cradle or yoke, the former is dealt with in particular in this article. This tube member is made up of several sub-assemblies—the cage, top ring, five central

panels, a bottom ring and a mirror cell—bolted together and connected by means of I-beam struts in the form of A-frames. It measures 22 ft. in diameter by 60 ft. in length, and weighs more than 150,000 lb.

Obviously, a structure having a member as high as a six-story building, and a supporting structure of the same length with a width equal to the height of a 4½-story building, presents unusual manufacturing problems.

ment and observers' house, is of one-piece fabricated and welded construction, 22 ft. in diameter and 12-ft. high, weighing 23,200 lb. when finished. It consists of a bottom ring of box construction joined to a top ring of I-section by eight box section columns and cross braced with 6-in. H-beams.

Prime Focus Cage Held to Close Tolerances

Fabrication was held to very close tolerances, especially the spacing of 40 pieces of 3-in. pipe in the bottom ring, on bolt circles of 21 ft. 8½ in. and 18 ft. 9½ in. respectively. These pipes serve as containers or pockets for 32 extension nuts to clamp the cage to the top ring of the tube on the outer bolt circle, and also for eight jack screws for breaking the joint when removing the cage. They were placed in position for welding by means of a jig or sweep covering one-eighth of the circle and swinging about the center of the layout.

The lower surface of the bottom ring of the cage has two annular bearing surfaces, 3½-in. wide,



FABRICATING and machining a structure as large as this mounting for the 200-in. telescope required resourcefulness. In order to manufacture, handle, transport, and erect this structure, it was necessary to build it in sec-

tions, which are bolted together to form the whole structure. Each unit is built up by welding and no bolts are used except at the joints connecting the units.

The prime focus cage, which is attached to the top of the tube and contains the prime focus equip-

which were machined on a 32-ft. boring mill, as shown in Fig. 1. The inner bearing surface contains an accurately machined keyway $1\frac{1}{2}$ -in. wide, which had to fit exactly on to a sectional key fitted into a similar keyway cut in the top ring of the tube.

Since the bolt holes had to be drilled from the finished surfaces and then spot-faced inside the above mentioned pipe pockets, it was necessary to obtain a starting point for centering the cage on the mill for machining the faces and the keyway, by working back from an average position of these pockets on the outer bolt circle. This was done by drilling eight $\frac{3}{4}$ -in. exploratory holes upwards from the blind ends of eight alternate pockets with the use of a centering device in the pipes. These drilled holes were also used later as a basis for the drilling layout.

Cage Bolt Holes Accurately Spaced

The cage, when mounted on the telescope tube, will support a 6-ft. diameter observers' house at the center, connected to it by four knife-edge or diaphragm plates. The design of the cage called for its orientation in any one of four positions on the tube, varying by steps of $22\frac{1}{2}$ deg. The bolt holes and holes to match the guide studs projecting from the top ring of the tubes were, therefore, required to be accurately spaced. All of this drilling was done while the cage was still on the boring mill, using a 10-ft. radial drill press set up on a 4-ft. table alongside the mill, as shown in Fig. 1.

On the bottom of the cage, between the annular bearing surfaces, were welded 16 pads in which the holes matching the guide studs were drilled on a 20-ft. 5-in. pitch circle. These holes were indexed by counting the number of revolutions of the driving motor for one-sixteenth revolution of the mill. Accurate readings of small fractions of a turn were obtained by means of a fixed pointer against a steel tape on the circumference of a pulley 25 in. in diameter. A reading of $1/16$ in. on this tape corresponded to about 0.002 in. displacement at the pitch circle.

One-half inch holes were drilled first, and pins fitted into them were used for checking the pitch with an inside micrometer from pin to pin. A further check was made by

measuring from the pins to a point in the drill press arm. In this way, the pitch of the holes was held accurately to within a few thousandths of an inch.

A jig centered on the above pins was then clamped on the ring, to space the $1\frac{1}{2}$ -in. holes in the outer and inner bolt circles. At the same time, the $\frac{1}{2}$ -in. holes were enlarged to $1\frac{3}{4}$ -in. These holes were enlarged later, during the assembling operation, by means of a $1\frac{3}{4}$ -in. shell reamer centered on temporary studs in the top ring of the tube.

Machining of Top Ring

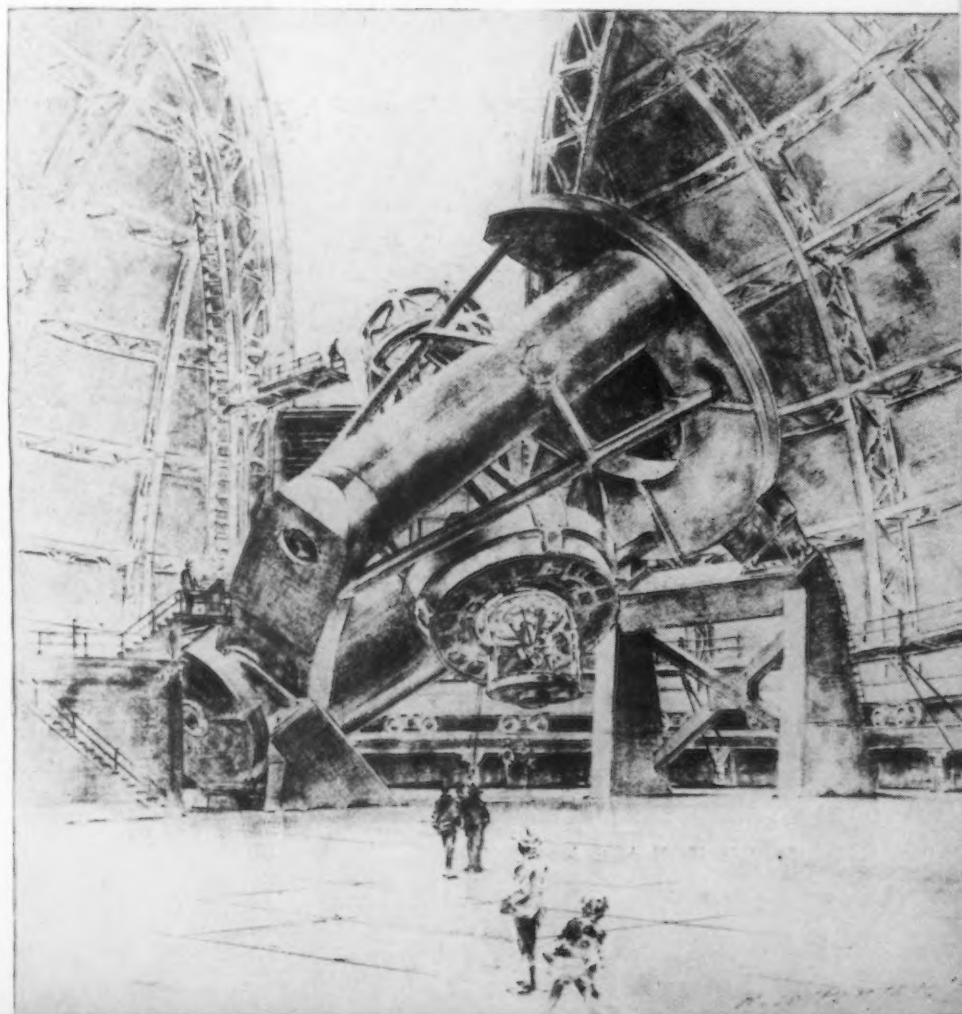
The top ring of the tube is of box construction, 22-ft. in diameter, having pairs of gusset plates at the quarter points for attachment of the tube struts. Its upper face is machined with two bearing surfaces and a keyway to match those of the cage. Each of the machined faces has 16 ($1\frac{1}{4}$ -in.) tapped holes for studs. Between the bearing surfaces there are in this case only four pads with $1\frac{1}{4}$ -in. tapped holes for the guide studs. All of this drilling and tapping was completed on the mill in a manner similar to the cage.

As it was not practical to fit the cage to the tube after its erection in the shop, the top ring of the tube was set up on parallel, with four temporary special studs in the guide stud holes. The cage was then set on the ring in the first of the four marked positions, and four of the matching holes enlarged with a $1\frac{3}{4}$ -in. shell reamer guided on the temporary studs. The position of the tapped holes for the $1\frac{1}{4}$ -in. studs in the ring was checked by observation through the holes in the bottom of the pipe pockets in the cage. The cage was next lifted and rotated $22\frac{1}{2}$ deg. for each of the other three positions, and the other three groups of four holes for the guide studs reamed out in the same manner. The cage was then removed and the proper guide studs and holding-down studs fitted. Finally, it was tested in all the four positions to make sure that all the studs were clear of the holes in the cage.

Operations on Bottom Ring of Tube Member

The bottom ring of the tube to which the mirror cell is attached with eight knee brackets, is also

SKETCH of the completed 200-in. telescope as it will appear after installation at Mt. Palomar, Cal.



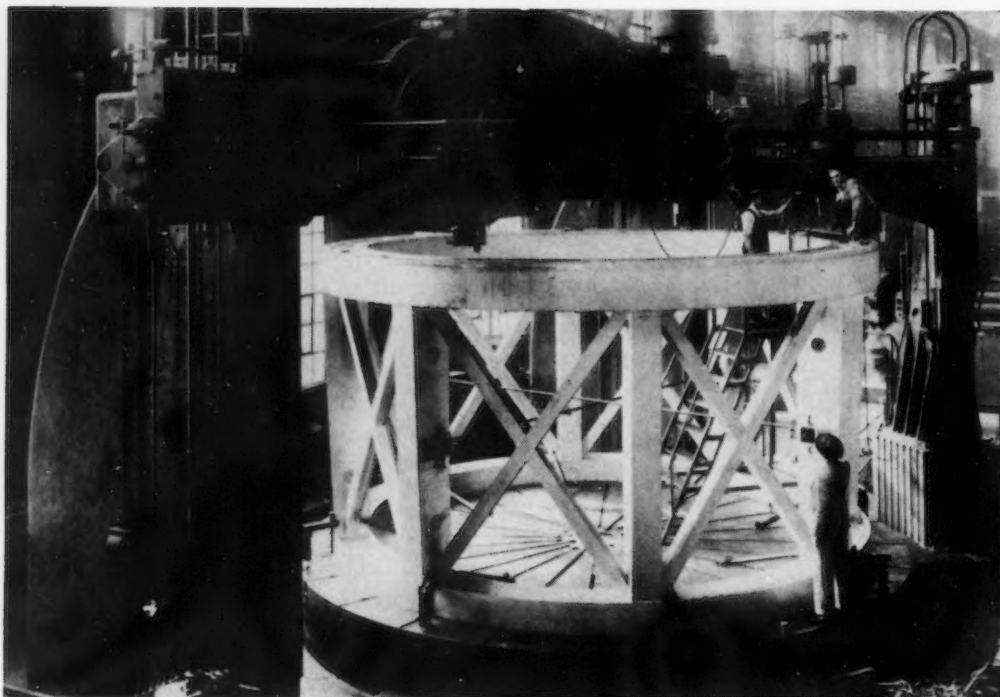


FIG. 1—Machining joint of prime focus cage on a 32-ft. boring mill. The radial drill on the table beside the mill is for drilling bolt holes in the lower ring of the prime focus cage.

of box construction, 22 ft. in diameter, with a conical outer shell, having pairs of gusset plates at the quarter points for attachment of the tube struts. These gusset plates form the sides of four rectangular boxes with machined pads on the top. The inside diameter of the ring is 17 ft. 8 in., leaving a surface 14-in. wide on the inner side of these boxes, forming a continuation of the top of the ring.

On this surface are 16 machined pads 11 by 16 in., each with a $4\frac{1}{2}$ -in. bored and reamed hole surrounded by a partial circle of $\frac{5}{8}$ -in. tapped holes. These bored holes are for locating the housings for the driving units for the mirror shutters or safety covers, and were required to be accurately spaced. Outside of this ring of pads are two groups of pads for two driving motors. As these pads are placed

between the rectangular boxes, it was not possible to machine them in the ordinary way. Consequently, they were finished individually by reversing the mill like a planer, using a clapper box for the tool. See Fig. 2.

The bottom of this ring has eight finished pads for the mirror cell brackets. These also have three bored holes for locating blocks against which the cell brackets are

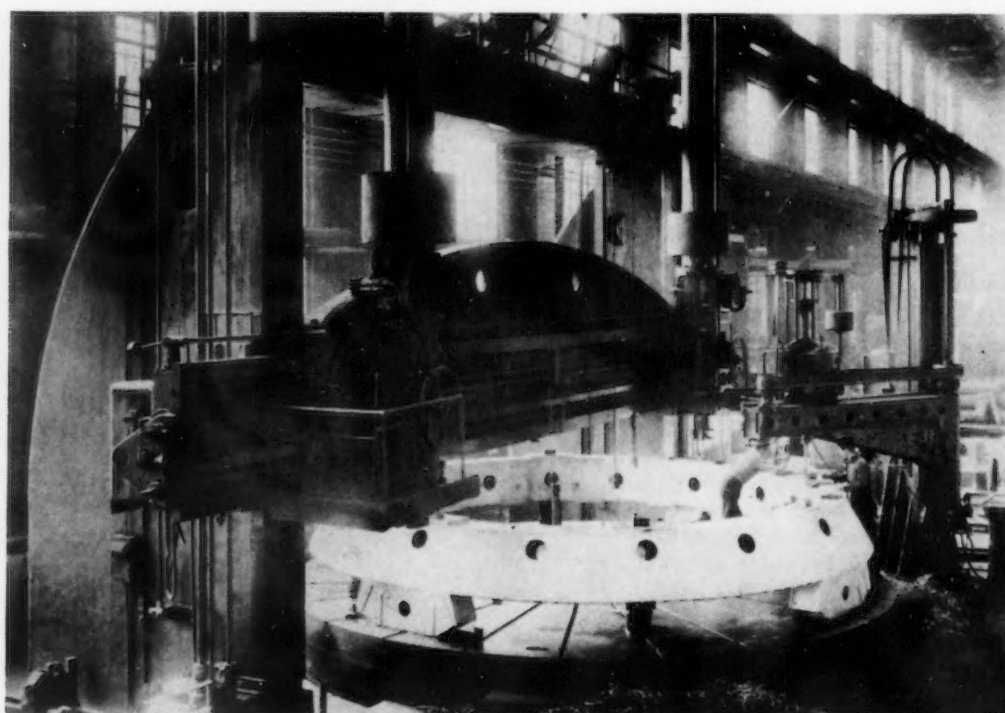


FIG. 2—Machining pads on the mirror cell ring, reversing the 32-ft. boring mill like a planer and employing a clapper box for the tool.

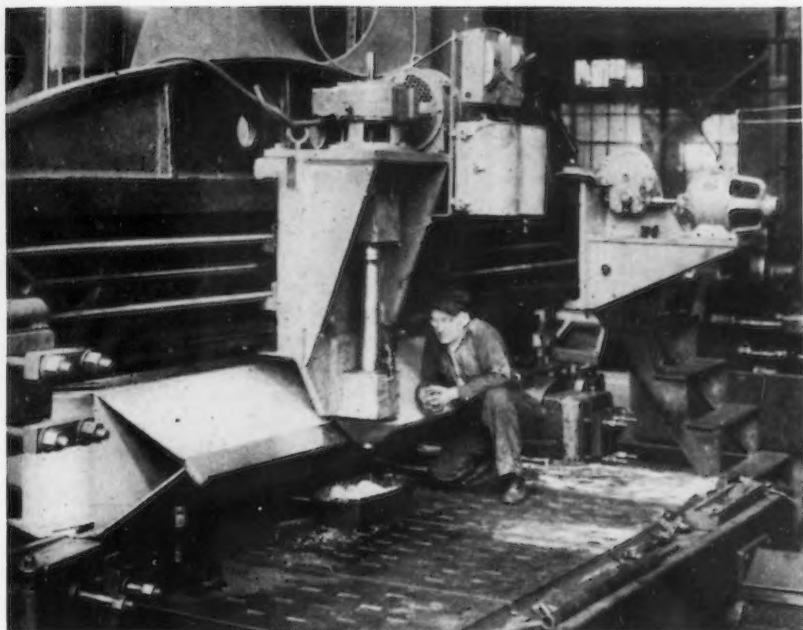


FIG. 3—Milling attachment on the cross-rail of a 14-ft. planer for machining the flange joint of the "elastic hinge." These hinge members are 20½ ft. wide.

adjusted by set-screws, for aligning the optical axis of the mirror.

The east, west and north tube panels are of box construction, ribbed and stiffened with diaphragms. The south panel is in the form of two triangular trusses separated by a long slot extending from the top to the bottom ring of the tube. The panels form a frame 22 ft. square at the center of the tube. They are connected at the corners of the square by flanges arranged at 45 deg. to the planes of the panels. These flanges are welded to the end plates where they converge to form a 90 deg. Vee. This construction provides a certain degree of flexibility in the connections and thus prevents the locking up of any stresses in the structures.

Flange Machining Required Special Equipment

The machining of these flanges called for special equipment since no planer was available to finish pieces 20½-ft. wide. This was done by means of a milling attachment mounted on the cross-rail of a 14-ft. planer, with a feed along the

rail driven by a separate motor and worm gear reducer. The mill-

ing fixture itself, Fig. 3, has a vertical spindle driven by a motor and worm gearing, with a 90 deg. conical cutter with spiral cutting edges.

The two ends of each of the east, west and north panels were machined with this attachment, the planer table being traversed to bring the flanges into position next to the cutter. Absolute parallelism of the flanges was insured in this manner. The angles of the faces were checked with a sine bar. Small machining lugs at each end of all the flanges were milled off vertically to give an exact overall length of the panel, where their faces intersected the 45-deg. flanges on the center line of the width of the panel.

The flanges of the two halves of the south panel were machined in the usual way on the planer, since these pieces were only half the dimension of the other panels.

How the Tube Was Assembled

In assembling the tube, the east, west and north panels were first

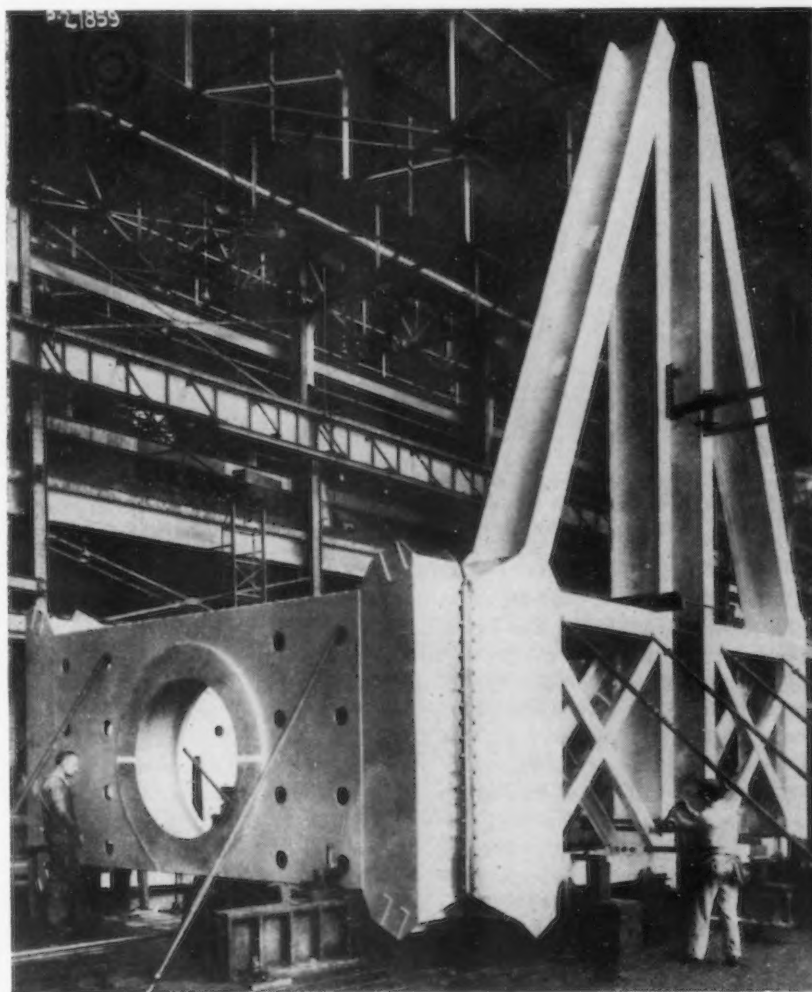


FIG. 4—Tube panels being set up and accurately aligned, preparatory to drilling and fitting bolts in the panel hinge flanges.

set up on parallels on the floor plates to an accurate layout. The machining lugs on the end flanges were used to advantage by dropping plumb lines from them to the corners of the layout. The three panels were then clamped together

distance from the center line of the tube by dropping plumb lines to the layout. This depended on the accuracy with which the connecting flanges were planed with respect to the ends of the trusses. After a thorough check-up, the

The next step was to assemble the 21-in. I-beam struts joining the top ring to the ends of the panels, by inserting them between the mating gusset plates at each end and clamping them securely in place. The alinement of the top ring was then rechecked, after which all the strut connections were drilled and reamed for 1-in. fitted bolts. Four $\frac{3}{4}$ -in. taper pins also were fitted in each beam connection to facilitate erection in the field. The jacks under the top ring were then backed off.

Boring Panel Bores for Gimbals

The weight of the telescope tube is carried by the flexible gimbals mounted in the east and west panels. These gimbals in turn are bolted to hollow spindles rotating on ball bearings which are mounted in the center sections of the tubular yoke girders.

The center lines of the panel bores for the gimbals were required to be as truly parallel as possible to the face of the top ring. For this work, a 10-in. boring bar having a screw feed to the traveling head was set up on three pedestals, one in the center of the tube and one outside each panel, with a worm gear belt driven from a motor on the floor. See Fig. 5. The boring bar was checked for parallelism with the top ring by means of what was virtually a hook gage. The diameters of these bores are 60 and 66 in. respectively.

The maximum driving length of the bar was about 26 ft. Because of the tendency of the bar to sag under its own weight and the weight of the boring head, it was necessary to set a lathe steadyrest next to the latter. Likewise, in order to prevent chatter due to the torsional deflection of a bar of this length, only light cuts could be taken.

Due to its total length, it was not practical to assemble the entire tube in a vertical position. Consequently, after the panels were finish bored, the structure was braced with struts and laid down on its side. Then the lower ring or mirror holder was set up in position and assembled to the panels by 21-in. beams, using the same methods as in assembling the top ring.

All mating pieces were plainly marked and tapered dowels fitted to facilitate erection in the field.

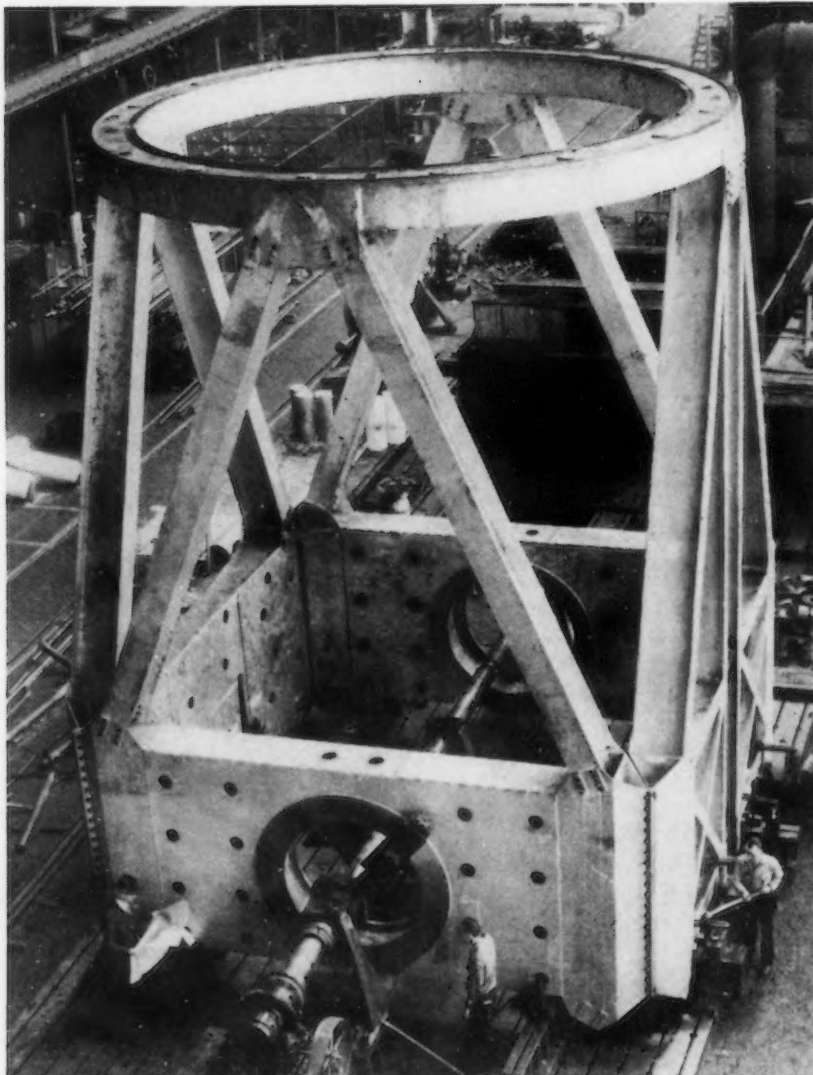


FIG. 5—For machining the panel bores for the bearing gimbals a 10-in. boring bar set up on three pedestals was employed. The maximum driving length of the bar was 26 ft.; bore diameters are 60 and 66 in. respectively.

at the flanges and braced with pipe jacks to the floor. The intersections of the machining lugs with the flanges on the south ends of the east and west panels were then checked for plumbness with a transit.

The upper halves of the south panel were next set up and adjusted with temporary spacing members clamped between machined pads on the webs of the beams forming the sides of the slot. The upper ends of the trusses had to be set at exactly the right

connecting flanges of the panels were drilled and reamed for 1-in. turned bolts in each. See Fig. 4.

Four 16-in. cast iron flanged pipes, capped with heavy screw jacks, were next set up in the corners of the square and a working platform was built around the assembly. The top ring of the tube was then raised and set on the jacks at the correct height, with the gusset plates at the south side of the ring slipping down over the ends of the trusses of the south panel.

Surface Broaching in High-Production Industries

SHAPE, size and the quantity of production are generally leading factors in selecting the type of machine to be used for finishing a part by the broaching method, it was stated in a joint paper* by Sol Einstein and M. Romaine, of the Cincinnati Milling Machine Co. Various types and sizes of surface broaching machines are on the market, comprising either continuous machines or the so-called ram type in which either tool or work is stationary, with relative movement between them in a straight path.

Advantages of surface broaching are:

- (1) Exceptionally high production in the machining of flat or irregular surfaces on duplicate parts.
- (2) Roughing and finishing to size in one operation.
- (3) Large production before re-sharpening.
- (4) High degree of finish.
- (5) Close tolerances maintained continuously.
- (6) Due to long tool life and exceptionally high production, low cost per piece.

The automotive industry offers the greatest possibilities of surface broaching. Among parts capable of being so machined are top, bottom, manifold face, water jacket, and flywheel housing of cylinder blocks; cylinder heads; crankshaft bearings; connecting rods and caps; shock-absorber arms; steering knuckles; shock-absorber bodies; transmission shifter rods;

rear-axle shaft ends and many others.

Limiting factors of surface broaching are: Work must be strong enough to withstand broaching stresses set up; it must have the ability to be supported firmly; and it cannot have any obstruction in plane of surface to be broached.

Today, practically all connecting rods and caps are finished by broaching. On previous equipments, the parting face and the half bore were machined simultaneously, using flat broaches which interlocked with a circular broach, but in a recent set-up the broaches are designed to machine the rod progressively, the half bore first and then the parting face. The tools for both portions of the operation were designed so that they took the full power of the machine, with the net result that the half-round portion was broached by a tool which was about 50 per cent as long as would have been required by the other method. In addition, the elimination of the interlock made both types of broach considerably cheaper to manufacture.

Cylinder-Block Broaching Machine

Outstanding surface-broaching operations are performed on cylinder blocks. To secure basic data, from which recommendations for broaching equipment could be made, a large experimental machine that was powerful and large enough to broach top or bottom, end or sides of any straight-line cylinder block of any passenger-car engine then in existence was built.

Different designs of cylinder block were broached experimental-

ly, and, as a result, the following factors must be determined before proper machines, fixtures, and tools for this particular job could be designed:

- (1) Total pressure the casting will stand without breakage.
- (2) Method of supporting the casting against the broaching pressure.
- (3) Arrangement of the tools so as not to exceed the strength limits of the casting.
- (4) Arrangement of the tools to remove the metal in minimum time and still produce a satisfactory degree of accuracy and finish.
- (5) Determination of chip size to be removed by each tool without causing excessive flaking-off or breaking-back of the edge of the casting at points where the tools leave the work at the end of the cut.

With the equipment for broaching the top surface of cylinder blocks production obtained from a machine is between: 50 and 55 cylinder blocks per hr. Since the machines are in actual practical use, the total labor cost per cylinder block was computed at \$.0039, based on a \$1 hourly rate, and the tool cost per piece at \$.045. These figures indicate a considerable saving in labor and tool costs over methods previously employed.

As a result of extensive experiments, the broaching tools used are of the inserted-blade type. They have been carefully designed to remove metal to a depth of approximately 3/16 in. in the minimum time and still produce finished pieces with unusually close tolerances for accuracy and flatness of surface and a high degree of fin-

*Abstract of a paper presented before the semi-annual meeting in Detroit of the American Society of Mechanical Engineers, May 17-21.

ish. The use of tungsten-carbide finishing tools is an important factor in obtaining these results.

Design of Surface-Broaching Tools

Since surface broaching is a relatively new art, design of the tools is based on the experience gathered from previous installations and experiments on practical applications. Two major items, size and shape, control this design. Naturally, the former is determined by dimensions of the piece to be broached, number of teeth, their pitch, percentage of teeth for roughing and finishing, rake and clearance angles, and whether the teeth are straight, spiral, or staggered. The latter is definitely governed, to a greater or lesser degree, by the part to be broached.

The tooth must be designed to have sufficient strength and also to provide proper clearance and rake angles. In a broach, the forward teeth remove the metal, and the last teeth prepare the finished surface. Thus, the front or forward teeth can be designed in a rugged manner with a relatively small rake angle to bear the brunt of the work of removing metal, while the last teeth can be designed with a higher rake angle to produce the smoothest possible surface.

The clearance angle on tools for broaching cast iron can vary from 2 to 5 deg. and have very little influence upon the force required to take any reasonable depth of cut. As in any other cutting tool, the factors governing the clearance angle on broaching tools are: First, the clearance must be great enough

to prevent the tool from dragging on the work; second, a larger clearance angle than is necessary is undesirable from the standpoint of economic tool life. Tools on the cylinder-block jobs have a clearance angle of 2 deg. and give satisfactory results. Clearance angles on tools for broaching various steels are somewhat similar to those for cast iron. Clearance angles of 2 or 3 deg. have been employed to good advantage on forgings of SAE 1035 and 1040 steels. For nickel-chromium steel, similar to SAE 3115, a clearance angle of 5 deg. was found best, since this metal has a tendency to tear and fuse on the tool, thus spoiling the finish.

The undercut or rake angle can vary from 0 to 30 deg. on cast iron and effects the cutting force and the finish obtained. Broaching experiments show that a rake angle of between 12 and 15 deg. produces very satisfactory results on cast iron with good finishes and comparatively long tool life. Practically the same results are obtained when broaching steels or malleable iron. For steel forgings, rake angles of 15 deg. are used. For stainless steels, rake angles between 20 and 25 deg. will improve the finish, but tool life naturally is less than when an angle of 15 deg. is used.

Side rake or shear angles improve the finish of a cut. For cast iron, side-rake angles of 20 deg. are recommended. For steels, this angle can vary up to 30 deg. Side-rake angles between 10 and 15 deg. are desirable on steel forgings, as they produce a fine finish and give satisfactory tool-life.

Chip Clearance

Chip clearance on a broaching tool is governed by three factors: First, the chip per tooth; second, whether the material being broached has a tendency to tear or whether it has an even chip flow; third, the nature of the chip itself; that is, if the chip tends to curl or remain straight or if it breaks or curls in one piece. Experience has indicated that a radius in the bottom of the tooth is best for aiding the chip to curl, particularly for broaching steel. Chip breakers are desirable on material that is tough and forms long chips and particularly when a heavy chip per tooth is formed. Chip breakers should not be used in the finish section of a broach or on those teeth immediately preceding it, since they tend to produce grooves, which the finish teeth do not remove. Generally speaking, they are not necessary on broaches for cast iron except on heavy roughing cuts.

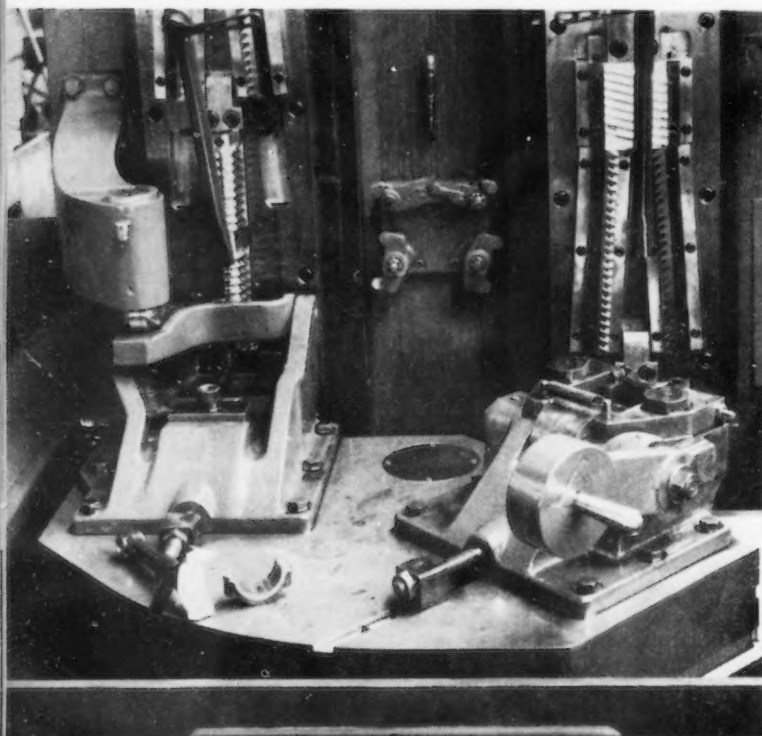
Chip size per tooth on a broach varies with the stages of metal removing. In the roughing section, the chip should preferably be short and thick, thus minimizing breakout at the end of the cut. The finish section of a broach naturally has to remove the rough marks and lines, produce a smooth surface, and, at the same time, give the piece its proper size. On steels, a chip per tooth ranging from 0.005 to 0.010 in. can be used in the roughing section, to 0.005 in. in the semifinishing and from 0.0005 to 0.002 in. in the finishing section.

Work-Holding Fixtures

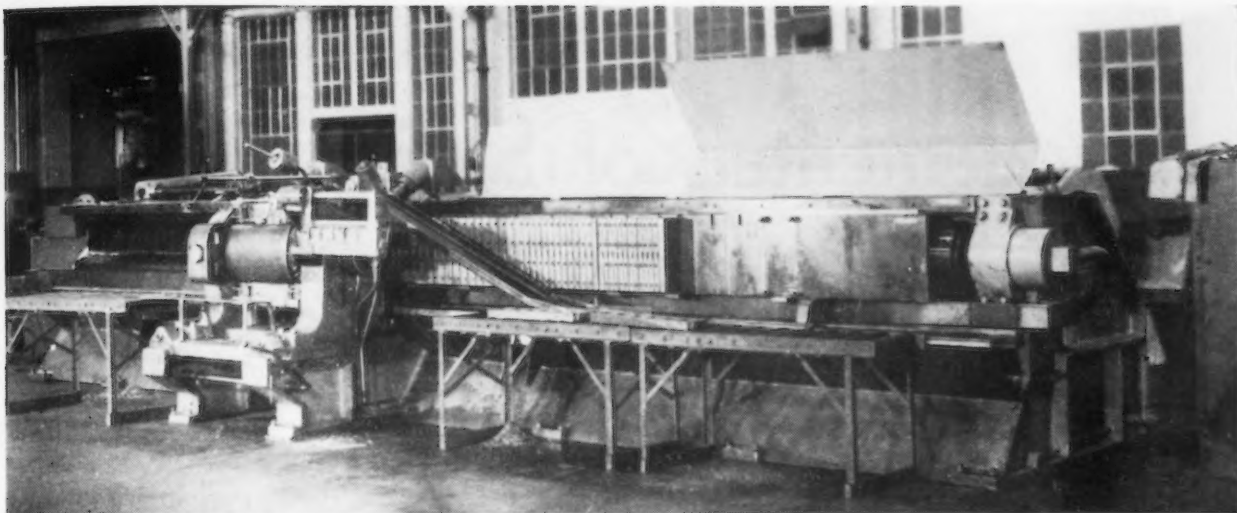
Forces set up by broaching are in two definite directions, one in line with, and the other normal to, the path of the broach, and these sometimes vary considerably in magnitude but never in direction. The most important point to be watched in broaching-fixture design is stabilization of the workpiece in the fixture to avoid vibration and springing while the cut is being taken.

Low Unit Time and Tool Costs

Low unit-time of surface broaching is due, in part, to the speed at which the cutter passes over the work, which is from 12 to 25 times faster than the rate in milling. The second important advantage of the broaching method lies in the low tool cost per finished piece usually obtained. In comparison with milling, first cost of broaching



VERTICAL duplex machine broaching the half bore and parting face on an automobile engine connecting rod.



tools is rather high. Milling cutters on the arbor may be compared with broach inserts, and, generally speaking, the cost of these inserts is higher than that of milling cutters. However, when comparing the total actual cost of the tools used in high production, the broaching tools show a lower total cost. This is due to the extremely long life between grindings, which is usually days with broaching cutters, as compared to hours for the milling cutters.

Long cutter life is due to a number of factors, among which rigidity of the average setup and low cutting speed may be mentioned. Milling cutters normally run at between 70 and 80 or more feet per min., while broaching tools pass through the work at approximately 30 f.p.m. One of the chief factors favoring the broach is the fact that a tooth takes a chip of constant thickness; it does not have to build up that chip from zero to the maximum thickness as the ordinary milling cutter does. The milling cutter has to be sharpened with a fairly high clearance angle and has to be backed off to maintain a rather small land, with the result that heat conduction from the milling cutter is poor. On the other hand, the broaching tool is not being forced into the work but splits off a chip ahead of it, with the result that it can be operated with a much smaller clearance angle. No necessity exists for any backing or back-off angle or of a narrow land, so that the heat conduction is better. In broaching, abrasion due to rubbing-over the work before starting a chip is eliminated, and lower clearance angles can be

THE work-holding fixtures on this special horizontal broaching machine for a 6-cylinder engine head permit the top bosses and water outlet face to be machined on one piece and the cylinder block joint face on the other. The work is loaded, removed and interchanged without stopping the machine.

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employed, resulting in a stronger tooth and less inherent wear of the tool.

Easier application of coolant is an important factor in broaching. On a broaching tool, coolant actually flows between the tooth spaces under a slight pressure, acting to separate the chip from the tool.

Broaching tools have a long life because the roughing teeth remove the metal and the finishing teeth do not encounter any scale and remove only the minimum of stock.

Depth of Stock Removed Is Important

Stock removal varies from a few thousandths to a total of about $\frac{1}{4}$ in. as the maximum. In almost every case where surface broaching has been applied, the stock is removed from a forging or from a surface previously machined, or from castings that were made in mechanical foundries by high-production methods where much variation in dimensions is not permitted. Only in high-production industries do rough parts come through with an average stock-removal of $\frac{1}{8}$ in. or less. Other industries cannot afford to spend the money on pattern and foundry equipment required to hold castings to certain close limits.

Stock removal has an important influence on broaching. If a piece

that normally requires a broach 30 in. long, and has $\frac{1}{8}$ in. of excess stock comes through with a total of approximately $\frac{1}{4}$ in. of stock to be removed, doubling the broach length is necessary, which doubles the length of travel and time required to produce the piece. Slowing down the speed does not remove excess material. Of course, two cuts could be taken if the equipment were designed so that the first $\frac{1}{8}$ in. could be removed at one stroke and then an adjustment made to remove the second $\frac{1}{8}$ in., but this is not usually done on high-production setups. The only way to play safe is to design the broaching tools for the maximum depth of stock that will ever be encountered. This means, of course, that the time per piece will be the same for pieces having less excess stock as it is for those with the maximum stock. From the foregoing, any increase in the use of surface-broaching machines would appear to depend more or less upon the development of forging and foundry practice to a point where variations in the depth of stock to be removed can be held within close limits to the minimum.

The rather high cost of tool equipment militates against broaching, especially in the low-production industries. Another point to be considered is that, even in high production, many pieces have a shape which precludes using the broach. To broach a surface on any part, this surface must be located on the work so that a broach of considerable length can be passed over it. Sometimes, meeting this condition is not possible, which eliminates the broach.

Fundamentals of Safety and Acci c

Abstract of Discussion of Mr. Burnett's Paper

By GEORGE T. FONDA
Weirton Steel Co.

WHEN the facts are so ably reviewed by Mr. Burnett, it is difficult to believe that so much has been accomplished in such a relatively short time. Prior to 1910 it was more or less an accepted fact that there would be from three to four fatal accidents per 1000 men per year in the steel plants of the country. But between 1911 and 1913 a movement was started by a group of enlightened "pioneers" in the steel industry, which culminated in the founding of the National Safety Council and the organized drive against industrial accidents was on.

We know that while wage earners in the steel industry were increasing from approximately 278,000 in 1913 to some 425,000 in 1923, during that same ten-year period, the frequency of fatal accidents was reduced better than 80 per cent to a rate of less than one fatality per 1000 workers per year. In fact there is every indication that this low rate was reached in 1920 and since that time has not only been maintained but consistently reduced.

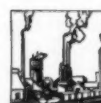
In the steel industry as a whole, there has been a yearly average of approximately 380,000 wage earners on the payrolls for the 17-year period 1920 to 1936. At the rate of fatalities indicated prior to 1913 there would have been a possible 1300 or more accidental deaths recorded, on the average, for each of the years from 1920 to 1936. How well the steel industry has carried on its campaign against industrial accidents is proven by the fact that, through intelligent supervision and efficient management, unbelievable reductions have been made in disabling and fatal accidents. In maintaining the low frequency rate for fatal accidents, a conservative estimate indicates that over 18,700 lives have been saved in the steel industry during the past 17 years.

There is just one other thought I would like to bring out. Recent events have served to create much confusion in the minds of the workers in the steel industry which is certain to have a detrimental effect upon accident prevention activities in the industry. Dating back some 30 years, selected groups of workers were organized into safety committees for the purpose of educating fellow employees in the elimination of unnecessary accidents. Without this cooperation of the workers themselves, the impressive record which has been made in the steel industry would not have been possible.

Next year the National Safety Council, founded by "Steel Pioneers," will celebrate its 25th anniversary and the iron and steel industry will receive the plaudits of the nation for its leadership and record of accomplishment. But we in the industry cannot rest content with our accomplishments of the past; we must go on. The American Iron and Steel Institute can do no greater work than to answer this challenge of humanity.

By L. H. BURNETT
*Vice-President, Carnegie-Illinois
Steel Corp.*

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THE American safety movement definitely started more than 30 years ago. Massachusetts and New York enacted laws requiring the safeguarding of machinery and safety inspection of factories in 1887. Before 1900 a number of other states had passed similar legislation. In general, however, during those early years efforts toward safety and accident prevention were scattered and there seems to have been very little appreciation of the employer's responsibility to prevent accidents or even of the feasibility of accident prevention, and both the frequency and severity of industrial accidents were extremely high.

The real, concerted safety movement may be said to have begun about 1907, stimulated by the severe criticism of the public press at that time, the increasing liberality of courts in granting compensation to injured workmen, and the vigorous safety campaign launched by the United States Steel Corp. and a number of other leading corporations.

In April, 1908, the Central Committee on Safety was formed by the Steel Corp. and it soon became an important clearing house for all of its many units. It is reported that at the end of the first two years of activity of the committee approximately 6000 safety recom-

* Abstract of paper presented before the general meeting of the American Iron and Steel Institute, New York, May 27.

Accident Prevention in Steel Plants*

mendations had been made, of which 93 per cent were adopted.

In 1907 the American Institute of Social Sciences started the American Museum of Safety in New York City. The museum was incorporated in 1911 and began at once an aggressive educational campaign on safety.

Perhaps the first technical association to appoint a safety committee was the Association of Iron and Steel Electrical Engineers, formed in 1907.

It was the first large organization to realize the necessity for the formation of a national organization "for the promotion of safety to human life," and at its convention in Milwaukee, held in October, 1912, it conducted the first Co-Operative Safety Congress and appointed a committee composed of industrial leaders and Federal and State officials "to organize and to create a permanent body devoted to the promotion of safety to human life in the industries of the United States."

The result of this resolution was the formation of the National Safety Council, which has become the largest and most influential safety organization in the world. It has extended its influence and assistance far beyond the industrial field, and today is composed of 27 sections, embracing practically every form of human endeavor.

The National Safety Council was not only founded and organized but fostered and financed by the iron and steel industry, until it became well and firmly established. The Metals Section of the Council is among the largest and most active today and some of its important contributions to the industry have been the com-

Abstract of Discussion of Mr. Burnett's Paper

By E. F. BLANK

Jones & Laughlin Steel Corp.

I MIGHT give a few illustrations as further proof of some of the timely statements made by Mr. Burnett and elaborate a little on some phases of the work which have been hobbies of mine for a number of years.

Little could have been accomplished in the beginning without mechanical safeguarding, of course, but the chief value of this today is to demonstrate that employers are interested in accident prevention and willing to do their part in making the plant as safe as is physically possible. Thousands of dollars have been spent in engineering and mechanical revision and safeguarding, to say nothing of protective equipment.

Mr. Burnett mentioned checking new plans for safety. As an illustration let me say that it cost \$40,000 to incorporate into our new strip mill plans the feature of safe clearance between the end tracks of overhead electric traveling cranes and building columns. But with all these modern safety features in building and machine guarding, operations cannot be made mechanically foolproof, and it is necessary to carry on an educational campaign to enlist the active support and cooperation of every individual in the plant.

A recent innovation in safety bulletins is the new jumbo poster distributed by the National Safety Council. This poster is 9 x 11 ft. in size and is produced in color. The slogans are short and to the point, can be read at a glance, and stand out conspicuously at plant entrances and other advantageous locations.

Too much attention cannot be paid to the foreman. He is just as important today as ever in industrial organization, and his careful selection and training are paramount if maximum results are to be obtained.

Another activity which has a bearing on safety is first-aid training, for while this work is primarily to train employees in caring for injured workmen, it of necessity calls attention to hazards, and emphasizes the importance of prevention. Many companies conduct first-aid contests between departments and plants in order to maintain interest in this worth-while endeavor.

Mr. Burnett has mentioned that a worker is safer in a modern steel plant than on the public highway or even in his own home. This has been substantiated in our experience by checking our group insurance records through which we have a record of practically all deaths in our organization. In one period of nearly 29 months in one of our plants, during which period there was not a single industrial fatality, 18 employees met death through accidents outside of the plant. During another period of 14 months, we found that seven had been fatally injured outside the plant, while there were no fatalities inside.

pilation of safe practice pamphlets; the furnishing of reliable accident statistics; the promotion and formation of safety codes, and the establishment and maintenance of local councils.

The safety movement in the steel industry was officially recognized when the American Iron and Steel Institute included two addresses on safety and welfare in the program for its general meeting in May, 1912. The papers were published in the 1912 year book of the institute.

Before compensation for accidents in industry had been inaugurated in the United States, the Bureau of Labor Statistics had been making an annual study (begun in 1910) of accidents and accident prevention in the iron and steel industry. In 1926 the bureau began the collection on a comprehensive scale of industrial accidents in selected manufacturing industries.

For this manuscript, the author has drawn freely from the literature of both the bureau and the council for information and statistics, and even though in every instance credit may not be specifically acknowledged, those familiar with such literature will readily recognize the passages.

It is thus seen that more than 30 years ago the iron and steel industry declared war upon industrial accidents. At that time the industry was classed as extra hazardous and the public, with good reason, considered the job of the steel worker an unusually dangerous occupation. As in the case of most wars, our war on accidents began as a mere skirmish conducted by a few faithful pioneers who realized that something must be done about the many injuries suffered by steel workers. The mass attacks upon the common enemy were to come much later, when it was fully realized that in order to win the battle it would be necessary to enlist the active services of every man in the industry.

Safety began as a purely humanitarian measure, to save lives and limbs, and to prevent pain, sorrow and suffering. There was not at the start much thought of saving money or improving efficiency. The enactment of workmen's compensation laws, however, from 1911 onward, which acted to throw a large part of the

financial costs of accidents directly upon the employers, brought the matters of efficiency and economy to the front and gave another strong stimulus to the further development of safety and accident prevention.

Early Accident Experience

Although accurate statistics are lacking as to the number, kind and severity of accidents in the iron and steel industry as long as 30 or more years ago, it is known that there are now only about one-ninth as many accidents per million man-hours worked as there were 30 years ago, and the number of days lost per year by such accidents has decreased to only one-third as many.

The Department of Labor reports that in 1907 there were 82.06 accidents in the steel industry for every 1,000,000 man-hours worked, and 6.9 days working time was being lost by injured employees for every 1000 man-hours worked. Since that year the general trend in both frequency and severity has been sharply downward, and only in occasional years has it turned slightly upward. In 1935, the last year for which complete records are available, the frequency rate was only 8.86, or only 10.8 per cent of the rate in 1907, and the severity rate in 1935 was only 2.04, or only 29.5 per cent of the rate in 1907.

It is to the everlasting credit of the leaders of the industry and indicative of their wisdom and common sense that they have gladly assumed their responsibility and have devoted their time and energy to safety work, and have spent millions of dollars in making their plants as safe and comfortable as engineering skill and ability can make them.

From the inception of the campaign, the steel industry has earned and kept its place of leadership in safety and has served as an inspiration and example, not only to other industries but also to legislators and officials who make our laws. Many of the laws on the statute books of our federal and state governments, with reference to safety, sanitation and welfare, are actual declarations of policies which were first adopted and practiced by the steel industry.

In 1935, the latest year for which the National Safety Council has published complete data, only

6 of 30 industries reporting to the council had proportionately fewer accidents than the steel industry. Of these six, only the cement industry is closely comparable with steel in manufacturing heavy products on a mass production basis. The five others were the tobacco, laundry, rubber, printing and textile industries. With respect to the severity of accidents, which reflects the number of days lost through injuries, the steel industry ranks twenty-fifth among thirty industries.

The reduction in accidents in steel plants has been so great that the manufacture of iron and steel is no longer considered as especially hazardous and the average mill man is no longer required to pay an extra premium for life or accident insurance. He is now a preferred risk and is much safer in a modern steel plant than on the highway, and safer even than in his home.

It was the firm belief of those who were active in the early days of the safety campaign that the thorough covering of all gear wheels and other moving parts of machinery would prevent the great majority of accidents. It was mistakenly assumed that practically all industrial accidents were due to unsafe working conditions and, therefore, preventable. While such work prevented many accidents, it was found that safeguarding alone was not sufficient. We had failed to give due consideration to the human element. The real value of thorough mechanical safeguarding cannot be underestimated, however, and strict adherence to this policy has been largely responsible for the marvelous improvements and changes that have been made in our plants in order to provide a safe environment for our employees.

The modern conception of a safe place to work, however, is much broader and includes practically every known safeguard. Today a safe plant must be clean and well ventilated, must have clear and well marked aisles, safe stairways and walkways, be well lighted and have an ample supply of good drinking water at the proper temperature. There must be proper sanitary conditions and expert medical and surgical service at hand. Where and when necessary, employees should wear safety shoes, should be supplied with suitable

goggles, as well as protective clothing and respirators in certain occupations.

The degree of improvement in working conditions and the extent of reduction in the frequency and particularly in the severity of accidents is the most outstanding accomplishment in the safety movement. A study of actual cases showed clearly that only a portion of the accidents were due to machines and that many of them

and to enlist the active support and individual cooperation of every employee from the highest to the lowest.

The principal features of the educational campaign and those which have been found to be most effective are:

(a) Mass meetings at which a talk on safety is given, together with suitable motion pictures and other forms of entertainment. Members of the families of em-

(c) Safety contests among various departments of a plant, in which a suitable trophy or prize is awarded to the winner, have proved to be very valuable activities in stimulating and in maintaining interest in accident prevention. Where properly conducted, a spirit of friendly but intense rivalry has been built up and in some cases reached such a degree of rivalry that the man who suffered an accident himself or injured one of his fellow workmen, through carelessness or negligence, was held by the employees themselves to be a real menace to the entire working force, and an undesirable workman.

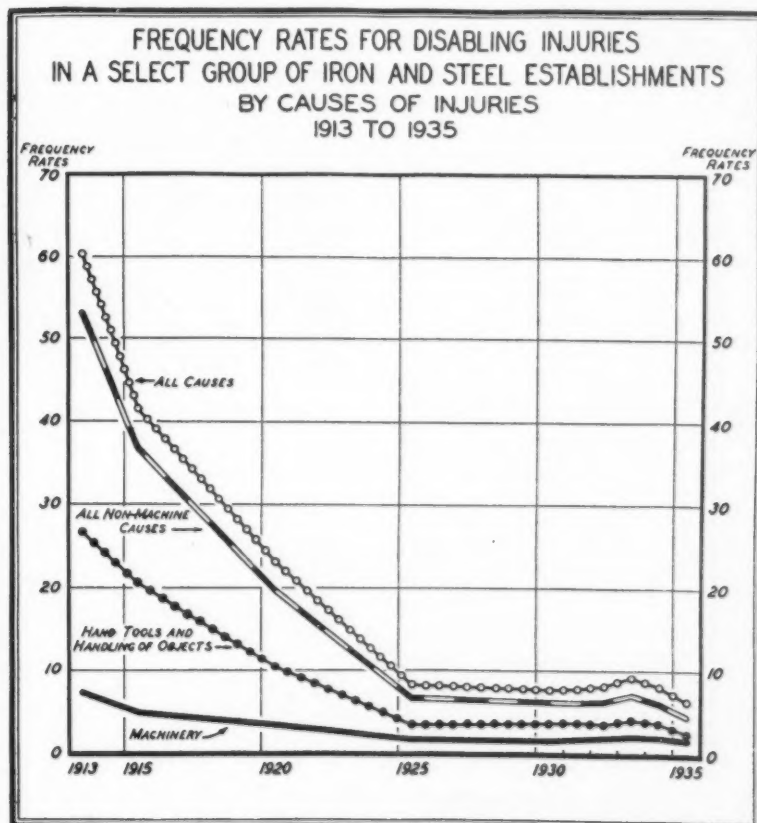
(d) Job analysis and job training are important features of safety work as applied to apprentices and other new employees.

A definite safety organization has been found to be essential in securing and maintaining the interest and cooperation of the employees. A safety organization in a large plant may consist of one or more safety engineers; a plant safety committee, consisting of department heads; department committees, consisting of foremen and supervisors, and workmen's committees. It has been found advisable to rotate the men on the workmen's committees in order to have as many employees as possible actually engaged in safety work.

It is the duty of such committees to study accidents in order to determine their cause and prevent their recurrence; to make periodic inspections of the plant and to seek out and eliminate unsafe practices. A careful and continuous study of dangerous practices and their elimination is essential. It is easy to sell the safety idea to the man who is actively engaged in the work.

The foreman occupies a most important position in the operating department, as he is in direct contact with his men day after day. He is the "key man" and, in the eyes of his men, he is the boss and representative of the company. He is directly responsible for the work of his crew, not only as to production, but also as to the safety of his men.

The National Safety Council in its lecture outline on "Reaching the Foreman," has said: "The (CONCLUDED ON PAGE 97)



U. S. Bureau of Labor Statistics

were caused by the ignorance, carelessness and negligence of the worker himself. The problem, therefore, was to sell the safety idea to the steel worker. Many of them were convinced that accidents were inevitable and that the employer was not sincere in his efforts to prevent them.

A general campaign of education and publicity was, therefore, begun many years ago and is going on today with such changes and modifications from time to time as actual experience has dictated. The general purpose was to dispel the idea that accidents are inevitable and just happen and that nothing can be done about it,

employees are often invited. Such meetings produce best results when held at the beginning of a general safety campaign.

(b) Safety posters displayed upon plant bulletin boards have proved to be an excellent means of selling the safety idea, especially when such posters are of attractive design and carry a real safety story. In this connection, it would be ungrateful on our part if we failed to recognize the valuable service rendered by the National Safety Council in providing a remarkable poster service, as well as a beautiful annual safety calendar and other forms of safety publicity.

A Round Dozen of Unusual

Collected by FRANCIS JURASCHEK
Consulting Editor, The Iron Age



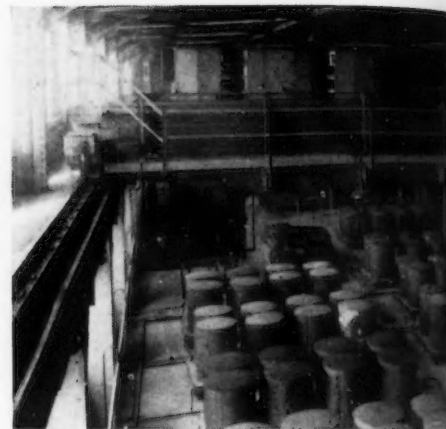
THERE are many special jobs of mechanical handling performed in and around an industrial plant which, because of the particular conditions surrounding the work, cannot be fitted into any comprehensive *system* of materials moving—such as may be planned to meet the needs of progressive production processes. Some of these special jobs may not be of great importance as regards the necessity of moving materials on a split-minute schedule to meet the requirements of other processes, as in an assembly-line procedure; while on others depends the constant flow of raw stuff which keeps a manufacturing plant going, or permits shipping to go and come on a definite time-table.

All of these special jobs, however, have these characteristics in common; that the mechanical equipment used lightens labor, speeds up moving, and reduces handling costs. Surely excuse enough for their use lies right here!

Because many such jobs do not readily fall into the general classifications which have been laid down for the purpose of logical consideration of the several systems of industrial mechanical handling broadly outlined in the present series of articles, from time to time various odd or unusual applications of

equipment will be shown and briefly described with no attempt to analyze their functional significance. Most of them, as a matter of fact, must be treated as isolated examples, without reference to any possible relation to other jobs, although a few may be keyed-in to a logical plan of operations. A round dozen of such jobs are shown here to illustrate certain out-of-the-ordinary ideas. Even casual study of these applications may show that certain jobs you are now doing manually and laboriously may be performed more easily and quickly (not to say profitably) by mechanical means.

No industrial production problem ever stays solved permanently. What was considered satisfactory yesterday is questioned today and scrapped tomorrow. Not only is this true within the manufacturing plant itself, where the steady upward trend in production quality demands constant attention toward the problems of closer coordination and timing of processes, and production costs must be progressively lowered to meet ever keener competition, but it is likewise true in connection with all the work involved in keeping that plant supplied with raw materials, and in taking finished product away from the plant after production has been completed.



MULTIPLE duty Whiting mill type Tiger hoist and a special "sheet."

Better handling methods are and have been a major factor in the reduction of production costs both within the plant and in the services which contribute toward making that plant operate efficiently. To take the utmost advantage of improved mechanical handling methods contributes, therefore, in many ways to the possibilities of earning extra dividends.

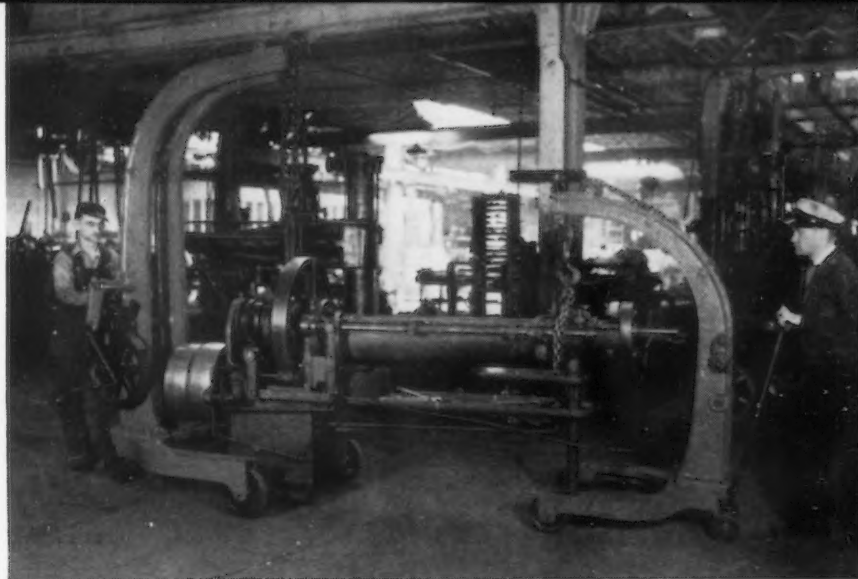
Two Governing Principles

It is sometimes difficult to determine under what conditions materials should be handled mechanically. There are two elementary principles that apply to any handling problem:

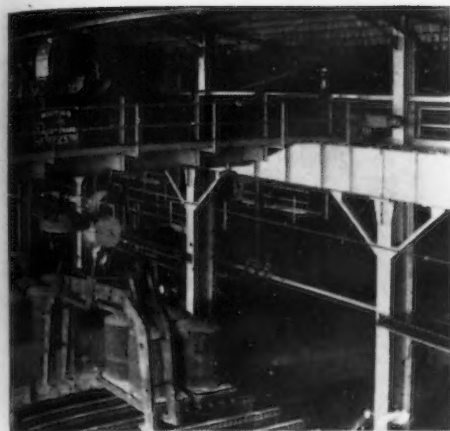
1—Only essential handling operations should be performed. This means, essentially, make the original carrier take the load as far as possible to the point of use, eliminating transfers from carrier to carrier except when absolutely necessary. It also means that the storage of materials should be so planned as to eliminate every possible step in rehandling.

2—Carry out the necessary handling operations by the most eco-

Handling Ideas



TWO Canton Foundry & Machine hand cranes transferring a thousand pound broaching machine to a new location in the manufacturing plant. o o o



crane, equipped with lifting magnet on auxiliary grab" on the main hoist hook.

nomical means. This involves weighing the cost, carrying charges, operating, and maintenance expense included in the use of mechanical equipment against the total costs of performing the oper-

ation either manually or by some other mechanical means. Of particular interest in contrasting manual with mechanical methods stress should be laid on the fact that excessive handling costs are usually found where more than one man is required to move a given load by hand, where manual efforts require a man to lift loads of 100 pounds or over, where the shifting of loads requires a man to lift to heights of five feet or more, and where manual efforts increase the

liability of damage or breakage in the handling of fragile goods.

It is in the operation of loading or unloading, not in the operation of transfer from point to point, that most excessive costs of handling occur. It will be of interest, therefore, in looking over the accompanying illustrations, to note that mechanical means of picking up and setting down the load are the major functions of practically all the special equipment shown, and consequently form the principal

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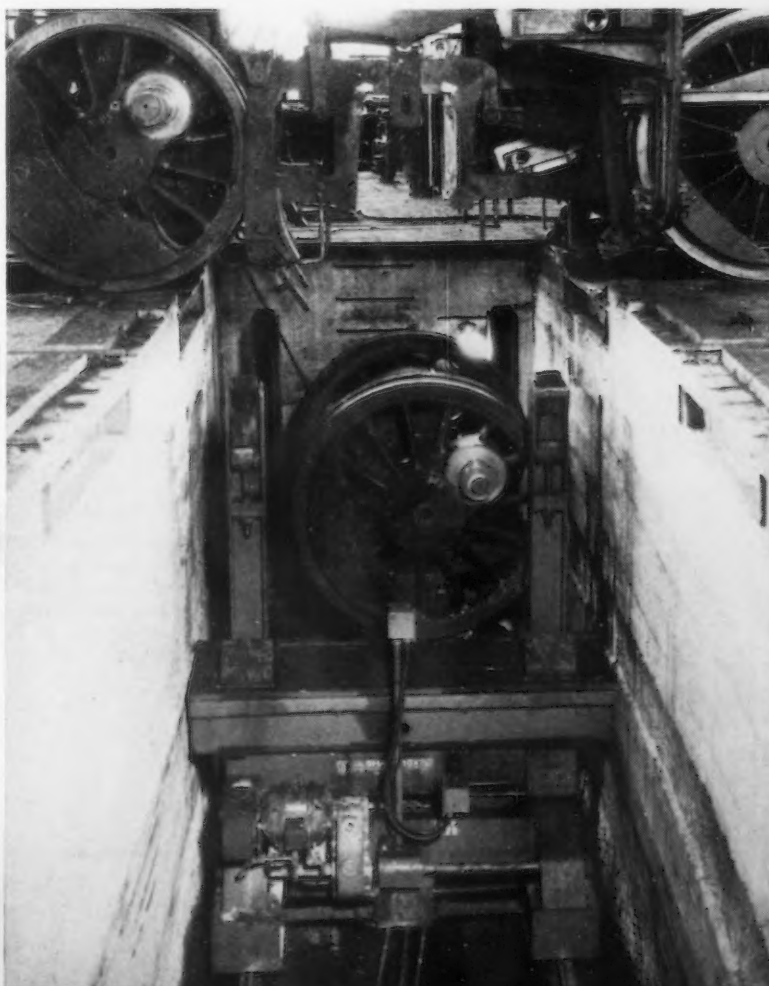
BELOW

CLEVELAND gantry crane excavates a ship basin and builds a pier; later will operate as a vessel unloader on the pier it has helped to build.



AT RIGHT

SHAW-BOX drop-pit table removes a pair of driving wheels from a locomotive for a much-needed machining operation.



means of cutting the cost of the handling operations.

The Whiting mill type crane is a multiple duty unit. With a span of 60 feet and a lift of 35 feet, the trolley carries a main hoist of 40 tons capacity and an auxiliary hoist of 25 tons capacity. The auxiliary hoist is equipped with a lifting magnet, of special value in picking up many small iron or steel parts at one time, or irregularly shaped objects that may be hard to grip or to carry in slings. Attached to the main hoist hook are special grab-tongs, used in this instance for picking up a metal skid platform carrying two heavy, filled metal drums. These tongs are especially useful for picking up piles of sheet metal, and are ordinarily known as a "sheet-grab," being found in frequent use in rolling mills and warehouses.

The Cleveland gantry crane was especially built for excavating a ship basin. The trolley will run far enough out on the overhanging bridge structure to permit the grab bucket to pick up the material to be excavated over 25 feet from the sheet piling forming the edge of the pier. The gantry runs along tracks laid the length of the pier, and on completion of the construction work, the equipment is designed for use in loading and unloading vessels moored to the pier, delivering materials to or taking from standard railroad cars running on tracks between the gantry legs.

Two Canton Foundry & Machine hand cranes are shown transferring a 1000 pound broaching machine to a new location in the manufacturing plant. For occasional odd jobs of moving machinery or heavy parts hand cranes of this general type are extremely useful.

Hoisting equipment is usually thought of as a piece of *lifting* apparatus. The reverse of a lifting operation is pictured in the illustration showing a pair of locomotive driving wheels being removed for a machining operation in a car repair shop. Shaw-Box Crane & Hoist Co. makes a "drop-pit table" especially for cutting the costs of this operation. The locomotive runs on its track to a position over the drop pit. The table is elevated to the pair of wheels over the pit, the wheels are detached from the locomotive frame, the table descends into the pit carrying the wheels, and then is pulled transversely along the rails laid on the bottom

of the pit to clear the locomotive. At the proper position the table rises to floor level to meet another pair of railroad tracks, over which the wheels are rolled to the machine which is to serve them.

An entirely different version of a vessel unloader is shown in the Wellman Engineering installation. This is called a "pier crane." A gantry-type structure runs on elevated rails set far enough apart to

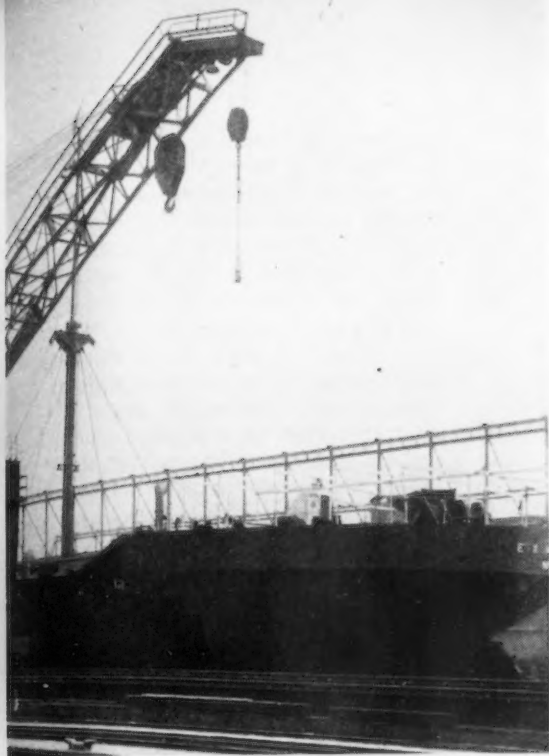


ABOVE
A WELLMAN Engineering pier crane with a boom swing of full 360 degrees serves vessels on both sides of the pier.

ABOVE
A THEW-LORAIN portable power crane equipped with a lifting magnet and mounted on a Mack truck makes a completely mobile scrap yard unit.



AT RIGHT
A THEW-LORAIN crane on a caterpillar-type tractor makes short shift of unloading bundles of steel rods from railroad cars.



ABOVE

SIX tons of coal in one bite is the capacity of this special Wellman Engineering coal handling bridge, serving a big storage yard.

o o o



permit standard railroad cars to run between the gantry legs. Atop the gantry, a powerful crane is set on a turntable, permitting the boom to swing full 360 degrees. Loading or unloading may thus be carried on from vessels docked at either side of the pier, to or from the railroad cars running along the pier.

Portable power cranes assume a myriad of forms, as the occasion demands. A Thew-Lorain "30" mounted on a Mack truck makes a completely mobile unit for a scrapyard — especially when equipped with a lifting magnet.

Another Thew-Lorain unit mounted on a caterpillar-type tractor makes short shrift of unloading bundles of steel rods from a railroad car at a construction camp. It would be just as useful in a mill storage yard!

The special Wellman Engineering coal handling bridge picks up six tons of coal at a bite from the storage pile, delivers it to a weigh larry which in turn discharges it to an oven-charger — both located within the long leg of the gantry.



ABOVE

ALIGHT Harnischfeger crane mounted on a standard railroad truck expedites the transfer of materials from railroad cars to delivery trucks or storage.

o o o

AT RIGHT

ATHEW-LORAIN crane on a railroad truck not only handles loading and unloading operations, but spots standard railroad cars in position.





AT LEFT
A UNIQUE lumber handling buggy, chain driven, carries loads of lumber to the platform triple chain belt conveyor. Courtesy Chain Belt Co.

BELOW
SHAW-BOX mono-rail electric hoist with special rig to facilitate transfer of loads intact from road trucks to special yard handling truck.

The far side of the storage yard is bounded by a wall, along the top of which are laid the rails for the travel of the short leg of the bridge. This bridge serves a yard some 120 feet wide by more than a thousand feet long.

The light Harnischfeger crane mounted on a standard gage railroad truck is in constant use transferring material from railroad cars to delivery trucks or to storage piles located adjacent to the railroad.

The Thew-Lorain railroad truck-mounted "60," with lifting magnet, pulls a loaded freight car to position, unloads the pigs of iron or the scrap metal it contains, then pushes the empty car back into place for the next train through to pick it up.

A unique lumber handling buggy is shown ready to deposit a load of lumber onto the triple chain belt conveyor located in the wooden platform. The rear wheels of the buggy are chain driven; these chains and the platform conveyor are both of Chain Belt Co. construction. Somehow this buggy is reminiscent of the first Ford automobiles. It would be interesting to



imagine what Henry Ford himself might have done with a streamlined version of this lumber buggy.

Another lumber handling device of special design is also shown. Its function is to transfer loads from

regular road trucks to the special yard-handling truck shown in the background, or vice versa. An electrically operated Shaw-Box mono-rail hoist carries a rig designed to permit one man to lift an entire truck load of lumber off one truck and deposit it on the other. For other uses it is plain that a slight modification of the monorail bridge structure would permit the loads to be transferred to adjacent monorail trackage at either end of the bridge, thus permitting the hoist to carry the load intact to any part of

the yard or into adjoining buildings.

A similar portfolio of unusual mechanical handling jobs involving different types of equipment will be presented in the near future.

Flamenol Cable a Radical Development

A NEW synthetic insulating compound being introduced by the General Electric Co., Schenectady, under the trade name Flamenol, is termed by its makers the most radical cable development in the last 25 years. While similar to rubber in its characteristics, it contains no rubber and will not

support combustion. It is highly resistant to moisture, acids, alkalis, and oils, and is said to have excellent aging characteristics and to be strong mechanically.

The properties of Flamenol are such that it can be made a very soft and flexible compound, or made to be one with celluloid-like rigidity. It can be put into solution for coating or impregnating, and can be compounded, filled, calendered, and extruded in much the same fashion as rubber.

Flamenol-insulated cable is recommended for power and control circuits at 600 volts and less, and for operation at a maximum copper temperature of 60 C. It is well adapted to machine-tool wiring, switchboard wiring, and battery and coil leads. It is available in a variety of colors to facilitate circuit tracing. Except where the cable will be subject to extreme mechanical abuses, Flamenol is used without any protective finish, such as braid, lead, or armor.

Machine Tool Builders Contribute to Mass Production

THE fact that the automotive engineer's chief function is to make the public unconsciously dissatisfied with today's cars by offering better vehicles at lower prices each year, dictates to the machine tool builder that next year's production equipment must supply higher quality parts with lower labor costs. This was the contention of Fred W. Cederleaf, Ex-Cell-O Aircraft & Tool Co., who spoke* on the machine tool builders' contributions to mass production of automobiles. The demand for closer tolerances, trouble-free automatic operations, less down time, and more pieces per hour is never ending and is coupled with another that the machine be more or less standard or flexible so that it can be retooled for the next year's parts with the minimum change. These demands have been responsible for keeping the machine-tool engineers on their toes so that they can keep in step with the progress of the industry.

Contrary to the impression that some advertisements attempt to convey to their readers, the improvements offered each year by machine-tool builders, are not revolutionary but on the contrary are gradual and well in keeping with the refinements developed annually by the automotive industry. The danger of a machine-tool builder developing a new product that would render obsolete all other similar-purpose machines now in use is no greater than that of an automobile company designing a new model that would force every owner, by economic necessity, to scrap his present car and purchase the new vehicle. For instance, 10 years was consumed in reducing the tolerance on the diameter of a cylinder bore from 0.001 to 0.0005 in. In 1926, the majority of the automobile companies specified a tolerance limit of 0.001 in. for out-of-round and taper in cylinder bores. Today, only two or three are able to produce these bores to with-

in 0.0005 in. out-of-round and taper.

In 1926, several different methods were used to machine bores of automobile-engine cylinders. Some companies used a piloted reamer for the first operation. Others used the so-called "stubbing" operation, a reamer without a pilot. The second operation universally employed a piloted, top and bottom, single- or double-lip, boring bar which would produce correctly located bores. The next operation used a floating reamer to follow the previously bored holes and ream them to size, after which they were either honed or burnished. Although these methods were generally accepted as being satisfactory, at times the automotive engineer demanded a better product. Unable to obtain greater-precision machine tools at that time, selective assembly was the only recourse. Eight or ten different sizes of pistons were graded and stocked. Cylinders bores were measured and marked to correspond with the pistons. As a double check on the engine-assembly line, a feeler attached to a fish scale was assembled with the piston in the cylinder bore, and a scale reading taken when the feeler was removed.

At times, field trouble was traced to cylinder bores being out-of-square with the crankshaft center line. Attempts were made to correct this trouble by using a piloted boring bar with single-point tool as a substitute for the final floating reamer operation. Two objections to this method were (a) it necessitated a feed of about $1/32$ in. per revolution instead of $3/16$ in. which was readily obtained with

the multiple-blade reamer and (b) holding size with the single-point high-speed tool was difficult. Consequently, most manufacturers returned to the floating reamer and let the piston-ring boys hold the bag for a while.

Then, came the cemented-carbide-tipped tools. Even this new cutting-tool alloy could not revolutionize the industry overnight, as none of the then existing machine tools could operate at the proper surface speed for this new material to attain its greatest efficiency. But today carbide-tipped tools, which run at a surface speed of 400 f.p.m. in spindles with bearings made for this service, are producing cylinder bores with an alignment that was formerly only obtained with piloted boring bars and, in addition, are holding a less than 0.0005-in. tolerance much more readily than the 0.001-in. limit formerly attempted with floating reamers. Nearly interchangeable manufacturing is now possible.

Many Industries Contributed to Tolerance Reduction

In the past 10 years, the equipment developed expressly to improve the tolerances of automotive-engine cylinder bores, included reaming and honing machines, hones and hone holders, measuring instruments, reamers, floating-reamer holders, cutting materials, cutter-grinding machines, and many other products. Consider for a moment the cycle of progress as it pertains to finishing a round cylinder bore in an automotive engine and note the part that the machine tool plays in this picture.

*Abstract of a paper presented at the semi-annual meeting of the American Society of Mechanical Engineers in Detroit, May 17-21.

The first picture, back about 1906, is single-spindle boring machines operated by skilled operators, using single-point high-speed tools in piloted boring bars, traveling at approximately 80 r.p.m. or a surface speed of 80 to 100 f.p.m., at a feed of about 0.015 in. per revolution, or a cutting time of 4 min. for 6 in. Even in those days, the allowable tolerance probably did not exceed 0.0015 in. out of round or taper of bore. Next to enter the picture was the high-speed multiple-blade reamer which did not change the revolutions per minute of the spindles but did increase the feed to about 3/16 in. per rev., thus reducing the cutting time to 1/3 min. By using various ingenious floating holders and special reamer-grinding machines, the tolerance was reduced from 0.0015 to 0.001 in. and the skilled operator replaced with an unskilled man.

In 1935, the first production machines were built for specifically utilizing the advantages of the new cemented-carbide tools. Mainly due to the high cost of this new material, a single-point tool was again used, but the surface speed was increased to about 400 f.p.m. with a resulting spindle-speed increase to around 400 r.p.m., and the feed was reduced to approximately 0.007 in. per rev. which decreased the cutting time to slightly over 2 min.

However, this operation, as it stands today, can be handled by an ordinary operator who can produce bores which have a finish never dreamed of by skilled toolmakers of 25 years ago and a roundness variation of consistently less than 0.0005 in. If the past cycle of cylinder boring is any criterion of future development, the next logical step will be a tungsten-carbide multiple-blade reamer operating at 400 f.p.m. surface speed and a 3/16-in. feed per rev. To accomplish this will require considerable development of reamer-grinding and lapping machines, and likewise, possible changes on reaming spindles.

Piston-Pin Holes

Piston-pin bores in pistons have been another elusive task to keep the master mechanic awake at night. The two principal problems were size and alignment of holes. Before the present use of precision boring machines which is almost universal, for this operation, most plants attempted to maintain alignment by piloted boring bars with

high-speed steel tools and then obtain size with solid reamers piloting in previously bored holes. One plant increased the life of a solid reamer from 1000 to 10,000 holes by reverting to carbon steel instead of using high-speed steel. This was based on the principle that, as the reamer was used for sizing and did not operate at surface speeds which were detrimental to the temper of the tool, advantage was taken of the denser alloy carbon steel as compared with the sawtooth edge structure of high-speed steel.

Demands for more positive means of obtaining closer tolerances on piston-pin bores were first felt by the machine-tool industry about 1928. The automotive engineer again created the demand by deciding to increase the engine compression with resultant piston-pin knocks. Fitting the pin tighter in the piston eliminated the knocks but caused piston scoring because when the pin length increased after the engine was heated, the skirt was pressed against the cylinder wall with sufficient force to cause scoring. This was before the days of tin plating.

At this time, the precision boring machine stepped out of the laboratory class and went into production. The results were so superior to reaming that the engineering department immediately reduced the limits in the small end of the rod from 0.001 to 0.0004 in. Plug gages, varying in size by 0.0001 in., were used for accepting or rejecting the work, and many battles occurred between production and inspection as to the exact size of the hole. The gage maker stepped into the breach with an indicating instrument that read the same for all concerned, but disclosed an out-of-round condition that was not shown with the plug type. To correct this condition, considerable testing was required to find ways and means of clamping the part without distortion.

Today, practically all piston-pin holes in pistons and connecting rods are bored in precision machines using diamonds for non-ferrous metals and the tungsten- and tantalum-carbide tools for iron and alloy-steel parts. Standard tolerances vary from 0.0002 to 0.0003 in., and operators in regular production have made as many as 180 parts per hr. to this limit, and

with an alignment that was never before attained by any method.

A few makers of high-priced cars avoided piston-pin trouble by using oil holes drilled in the connecting rod, thus allowing oil to be forced from the crankshaft bearing through the rod to the piston pin. This method was successful but was generally considered too expensive for cars in the lower-price brackets—about 7 cents per rod. One company tooled for the job with so-called "rifle-drillers" using a high-speed steel-tipped oil drill with a hollow shank, which was gripped in a friction-type chuck and set so that when the drill failed to cut at the standard feed, the chuck would turn and stop the machine. Cutting oil was fed through the center of the drill at a high pressure, thus forcing the chips out through the drill flutes. Tool cost was high and production per machine very discouraging. At the end of the first year, the tool cost for the oil-hole-drilling operation was 3 cents per rod.

Today, the same operation is performed but in a different manner. Standard, extra-length twist drills have replaced the tubular oil rifle drill. Hydraulically controlled feed has replaced the friction chuck, and the drill enters the connecting rod to a predetermined depth, is automatically withdrawn, and then returned by rapid traverse to within 0.005 or 0.010 in. of its previous stopping point. The labor cost of drilling has now been reduced considerably, and the drill cost per rod is approximately 0.3 cent.

In addition to the subjects mentioned, no list of machine-tool builders' outstanding contributions to the automotive industry would be complete without including those machines that drill or tap all the holes on five sides of a cylinder block in one operation; use broaches up to 80 in. long for surface broaching, finishing the top of cylinder blocks from the rough casting in one pass; weld steel water jackets on water-tight cast-iron cylinder blocks; and automatically perform various operations by hydraulic power under electrical control so that they appear human, plus many more developments too numerous to mention.

Some Possibilities of the Future

Unknown at present to the automotive industry is a machine-tool
(CONCLUDED ON PAGE 96)

High-Yield

Resilient Tin Plate



EVER since its conception about nine years ago, the idea of cold reducing tin plate basis steel, as opposed to the centuries old process of hot pack rolling to final gage, has been publicized as has no other innovation in the steel industry. A multitude of advantages has been claimed for this new product — first, and foremost, a greatly increased ductility; second, more flexibility in analysis; third, a superior steel surface; fourth, greater gage uniformity; fifth, less trimming waste; and, sixth, an improvement in the tin coating with less tin required.

Some of these blanket claims of superiority may be questioned, particularly the latter, but even while making due allowances for the enthusiasm and imagination of the sellers of cold-reduced plate, it is apparent that in general the advantage lies on their side, as attested by the enormous increase in demand for the product and the accompanying spectacular increase in new capacity placed in operation over the past several years. The

result is that today there is currently in operation or under construction enough cold-reduced capacity in the United States to take care of all normal consumer requirements.

It is a mistake, however, to too quickly belittle the attributes of conventional hot pack-rolled tin plate basis steel. Makers of containers still specify pack-rolled plate for many purposes even when cold reduced material is available, and indications are that this preference for the old-type material will last for some time, or at least until cold-reduction mills are able to duplicate the greater stiffness available in pack-rolled plate.

That is, the extreme ductility of the new cold-reduced plate has at the same time been a great advantage and disadvantage. Being soft, the metal could be drawn with ease and die wear minimized. But,

being soft, there was a tendency on the part of the cold-reduced material to "flute" or "panel" when bent into a can body (meaning that there are a number of localized bends in the tin plate when it is formed into a can cylinder, rather than a perfectly smooth, uniformly curved surface), to be dented during its journey to the consumer, or distorted due to vacuum or high pressure inside the container (beer in a show window may have an inside pressure as high as 75 lb. per sq. in.).

To minimize these tendencies, the can maker often corrugates the ends of cans, or uses a heavy stiff pack rolled plate for certain parts of the cans, or employs a concave can end, or specifies a heavy cold-reduced plate which has been stiffened in some manner.

Reflecting the demand of can makers for a cold-reduced plate

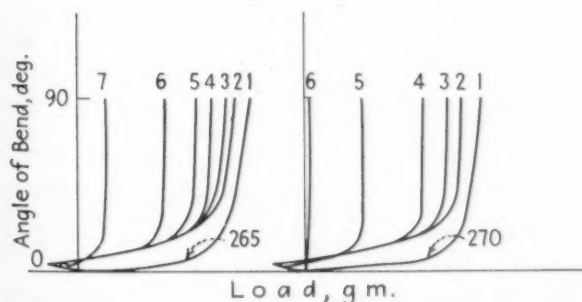


FIG. 1—Bend fatigue values for 38-gage Goss tin plate stock. This test covers values longitudinal (left) and transverse (right) to the rolling direction. Note the break in the first curve as the yield point is passed. Also note the slow progressive failure of the specimen, as it is bent through 90 deg. once, twice, etc.

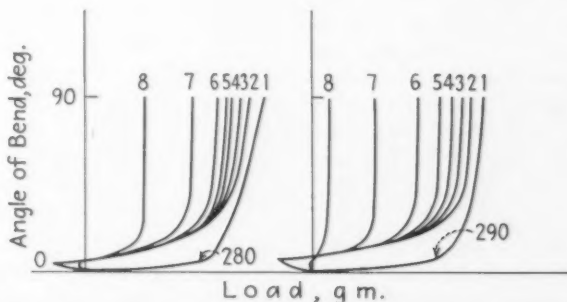


FIG. 2—Bend fatigue values for the same tin plate as in Fig. 1, after heat treatment for 30 sec. in solder at 625 deg. F. Although ductility as measured by the Olsen cup test is reduced on aging in the tin pot, see Fig. 3, these bending fatigue values remain the same or actually increase after treatment in the tinning pot. In each bend note how the yield strength drops slowly at first, then rapidly. This characteristic varies greatly in different plates.

equal to pack-rolled plate stiffness, steel makers over the past few years have adopted a variety of practices to alter the characteristics of the cold mill product. Keeping in mind that considerable ductility must be retained, makers have gone back to the open hearth to manipulate the analysis of the steel. They have tried heat treatment of the stock at a low temperature (say, about 1000 to 1150 deg. F.), or, most frequently, they skin pass the steel after a conventional annealing treatment. Sometimes this final skin pass is not the usual 1 or 2 per cent, but may even go up to 6 or 10 per cent (one maker uses two cold mills in tandem for these

point is about 39 kg. per sq. mm., as against anywhere from 24 to 30 kg. per sq. mm. for most of the conventional cold-reduced tin plate stock.

Despite the high yield point and the lowered ductility, it is said that there is no tendency to tear in the dies, because the effect of directional properties of the physicals in the plate are compensated by this process, and the plate has a very high bend fatigue value, as demonstrated in Figs. 1 and 2.

These bend fatigue values were obtained in a machine adapted to tin plate testing by C. C. Willits, of Continental Can Co. A standard specimen is clamped in holders and

related to heat treatment below recrystallization temperature. It is interesting to note that whereas Olsen cup test values are reduced by aging at tin pot temperatures, the bending fatigue values (Fig. 2) remain the same or increase. This indicates that ductility alone as measured on the Olsen machine does not completely determine the workability of tin plate.

Due to the high yield and resilience of the plate, it is claimed that cans can now be made of much thinner stock, say 0.006 in. thick, or 38 gage, the resulting can being as strong as containers now being made of heavier gage stock.

It is claimed also that "fluting" or "paneling" during can manufacture is eliminated, and that the complete cans do not deform or are not easily dented in transport. And, despite being very stiff, it is said that the material sets well during can making, there being no tendency to spring back at the seams thereby breaking solder and ruining the can.

It is further stated that because of the suitability of a thinner plate, it is possible to make usable cans 10 to 30 per cent lighter in weight. At the present time a full line of cans has been made experimentally from 38-gage plate, ranging in size from one-half pint to one gallon. Although this plate is extremely thin, particularly for the large container, it has been noticed that when filled there was no tendency to permanently dent when treated roughly.

This new product can be made from bessemer, open hearth or copper bearing steel, steel very low in metalloids and steel with carbon below 0.057. The choice of the type and analysis of the basis metal depends entirely on the physical properties desired by the manufacturer of the container.

For general use the yield strength and bend fatigue values are approximately equal longitudinally and transversely to the rolling direction, as shown in Figs. 1 and 2. However, for special container requirements, different combinations with and cross grain can be obtained by suitable control of the cold rolling and heat treatment. Another characteristic of this new product is its great uniformity of physical properties from sheet to sheet, a highly desirable quality.

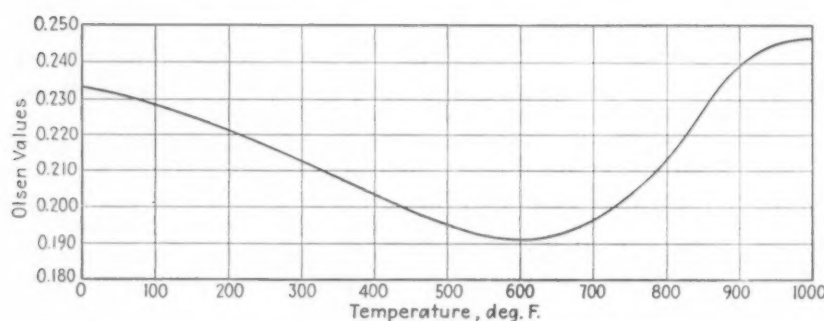


FIG. 3—Loss in ductility of cold rolled strip heat treated below recrystallization temperature.

heavier reductions), in which case the operation ceases to be a temper pass and becomes a full-fledged final cold reduction pass.

All this work has made available a much stiffer cold-reduced plate with no excessive loss in ductility. But, it is still said that the problem is not entirely solved, and can makers yet insist that even a stiffer material is necessary for certain uses.

The Cold Metal Process Co., Youngstown, has experimented considerably with the problem, ductility vs. stiffness, and Norman Goss, physicist for the company, has evolved a heat treating cycle which is coordinated with a final cold rolling pass of 12 per cent and even more, the result being a tin plate basis steel said to be the answer to the can makers' demands.

This basis metal, which has been produced in experimental batches, is called high-yield resilient tin plate. There is some loss in ductility due to the processing of the plate, but the ductility retained is ample for all can forming operations. At the same time the strength of the plate is very high—the yield

bent, singly or repeatedly through an angle of 90 deg., a stress-strain curve being automatically drawn if desired. On the first bend, the stress-strain curve proceeds smoothly and then sharply changes its slope, indicating a passage through the yield point of the material. The bend is continued to 90 deg., the recording pen is removed and the specimen bent back to its original flat position. Again the pen is placed on the graph and a second bend is started. The load required for the second and all succeeding bends is progressively smaller, the actual loads required and the number of bends required for failure depends on the fatigue resistance of the plate.

In the case of the Goss plate, it will be noticed in Fig. 1 that the failure is slowly progressive, requiring eight repeat bends in both the transverse and parallel directions. Note that the yield point, as indicated by the break on the first curve, is in the neighborhood of 290 gm. (the loading on the machine), for a 38-gage specimen. In Fig. 3 are data showing the loss in ductility of this new plate as

May Pig Iron Daily Output Up Slightly

DESPITE the strike at plants of three large independent steel companies, production of coke pig iron in May, at 3,537,231 gross tons, showed a slight gain as compared with the 3,391,665 tons in April. The daily rate last month increased almost 1 per cent over that in April, or from 113,055 to 114,104.

On June 1 there were 170 furnaces making iron, operating at a rate of 103,960 tons daily, against 187 on May 1, producing 114,665 tons daily. Twenty-four furnaces were blown out or banked during the month and seven were put in operation. Of the 24 furnaces taken off blast, 20 were at strike-bound plants of Republic Steel, Youngstown Sheet & Tube Co., and Inland Steel Co. The United States Steel Corp. put in two furnaces, merchant producers put three in operation and took one off blast and independent producers put two in.

In addition to the furnace changes given in last week's issue, page 106, 19 more furnaces were banked, including: Four Haselton, four River, one Betty, and one Pioneer, Republic Steel Corp., and three Campbell, one Hubbard, one Grace, one Jeannette, two Iroquois, and one Indiana Harbor, Youngstown Sheet & Tube Co.

The number of available furnaces making pig iron has been reduced from 242 to 241 by the dismantling of a Carrie unit of the Carnegie-Illinois Steel Corp.

Daily Average Production of Coke Pig Iron

	Gross Tons				
	1937	1936	1935	1934	1933
January ...	103,597	65,351	47,656	39,201	18,348
February ...	107,115	62,886	57,448	45,131	19,798
March ...	111,696	65,816	57,098	52,243	17,484
April ...	113,055	80,125	55,449	57,561	20,787
May ...	114,104	85,432	55,713	65,900	28,621
June ...	...	86,208	51,750	64,338	42,166
½ year ...	...	74,331	54,138	54,134	24,536
July ...	...	83,686	49,041	39,510	57,821
August ...	...	87,475	56,816	34,012	59,142
September ...	...	91,010	59,216	29,935	50,742
October ...	...	96,512	63,820	30,679	43,754
November ...	...	98,246	68,864	31,898	36,174
December ...	...	100,485	67,950	33,149	38,131
Year ...	...	83,658	67,556	43,592	26,199

Production of Coke Pig Iron and Ferromanganese

	Gross Tons		Gross Tons	
	Pig Iron*		Ferromanganese†	
	1937	1936	1937	1936
January ...	3,211,500	2,025,885	23,060	24,766
February ...	2,999,218	1,823,706	24,228	24,988
March ...	3,459,473	2,040,311	27,757	22,725
April ...	3,391,665	2,403,683	26,765	19,667
May ...	3,537,231	2,648,401	34,632	18,363
June ...	...	2,586,240	...	17,549
½ year ...	...	13,528,226	...	128,058
July ...	...	2,594,268	...	20,205
August ...	...	2,711,721	...	20,658
September ...	...	2,730,293	...	15,919
October ...	...	2,991,887	...	19,805
November ...	...	2,947,365	...	24,368
December ...	...	3,115,037	...	25,715
Year ...	...	30,618,797	...	254,728

*These totals do not include charcoal pig iron.

†Included in pig iron figures.

Merchant Iron Made, Daily Rate

	Tons				
	1937	1936	1935	1934	1933
January ...	16,106	10,537	3,926	7,800	2,602
February ...	16,514	11,296	6,238	7,071	2,863
March ...	16,467	10,831	7,089	7,197	2,412
April ...	14,517	13,897	8,799	8,838	1,908
May ...	19,483	12,814	8,441	9,099	3,129
June ...	...	14,209	7,874	9,499	4,088
July ...	...	11,619	8,644	7,880	6,783
August ...	...	12,148	8,194	6,043	7,756
September ...	...	12,526	10,090	4,986	10,034
October ...	...	13,645	11,199	5,765	8,634
November ...	...	14,739	12,503	6,610	7,639
December ...	...	14,852	13,312	4,399	8,358

Production by Districts and Coke Furnaces in Blast

Furnaces	(Gross Tons) Production		June 1		May 1	
	May (31 Days)	April (30 Days)	Number in Blast	Operating Rate, Tons a Day	Number in Blast	Operating Rate, Tons a Day
New York:						
Buffalo	222,273	220,156	11	7,170	11	7,190
Other New York and Mass.	27,737	7,226	3	970	2	575
Pennsylvania:						
Lehigh Valley	88,950	91,895	6	2,870	7	3,065
Schuylkill Valley	45,215	42,360	3	1,460	3	1,410
Susquehanna and Lebanon Valleys	33,542	25,641	2	1,220	1	855
Ferromanganese .....	...	...	0	...	0	...
Pittsburgh District	796,762	778,315	39	25,825	39	26,115
Ferro. and Spiegel	16,259	9,655	3	525	2	320
Shenango Valley	72,788	71,718	4	2,350	4	2,390
Western Pennsylvania	112,273	107,892	7	3,760	6	3,595
Ferro. and Spiegel	13,648	14,207	2	440	2	475
Maryland	139,705	142,822	5	4,505	5	4,760
Wheeling District	166,048	148,351	7	5,160	8	5,095
Ohio:						
Mahoning Valley	328,889	338,649	7	5,160	17	11,290
Central and Northern	317,828	297,689	12	7,625	17	10,775
Southern	50,843	48,599	3	1,570	4	1,620
Illinois and Indiana	714,324	677,948	27	20,675	31	22,930
Michigan and Minnesota	98,580	92,628	6	3,180	6	3,090
Colorado, Missouri and Utah	57,872	46,150	4	1,865	4	1,880
The South:						
Virginia .....	...	...	0	...	0	...
Ferromanganese	2,882	2,903	1	95	1	95
Kentucky	26,966	25,565	2	870	2	850
Alabama	200,147	199,564	14	6,440	14	6,220
Ferromanganese	1,843	...	1	165	0	...
Tennessee	1,857	1,732	1	60	1	60
Total	3,537,331	3,391,665	170	103,960	187	114,665

Research Work on Dust Diseases

A PLAN of medical and engineering research to combat industrial diseases due to dusts and fumes, potential peril to the health of more than a million workmen, has been announced by the Air Hygiene Foundation, Pittsburgh. The work is to be started as soon as arrangements can be made.

The organization, with headquarters at Mellon Institute, Pittsburgh, also announces the opening of a drive for broader support from industry to help this research. Approximately 170 firms, representing mining, metals, foundries, glass, refractories, ceramics and kindred industries are now affiliated with the foundation, a non-profit, scientific organization.

The program calls for studies at Saranac Laboratory, Harvard School of Public Health, University of Pennsylvania Hospital, Singer Memorial Laboratory and Mellon Institute, and for work in cooperation with the U. S. Bureau of Mines.

THIS WEEK ON THE ASSEMBLY LINE



... Sit-downs, slow-downs and skip strikes are met by orders from management to get back to work or go home.

o o o

... Auto manufacturers' leader foresees nationwide unified labor policy for the industry.

o o o

... Violence avoided in Newton Steel strike at Monroe; Great Lakes Steel Corp. employees face grand jury.

o o o

... Michigan labor bill passes House and is rushed to Senate for overhaul; only amendments are products of CIO attorney.

DETROIT, June 7.—The automobile industry, along with the rest of American business, seems to be gradually developing some effective methods of handling the strike wave that has plagued it. There are rare instances, so far, of outstanding success on the part of industry, but one minor case which may point the way for other firms is that of Fisher Body at Pontiac. Here the UAW members, directed by Fred Schwanke, Pontiac organizer for the UAW, were trying one of the newer varieties, the slow-down strike. The management acted quickly to avoid a prolonged slow-down or sit-down. The strikers were told that they had three

minutes in which to resume normal production. When they failed to reach a satisfactory gait in that time, the plant was shut down. The result was to throw out of work more than 3000 Fisher men and approximately 7000 Pontiac Motor Co. men because the Pontiac plant lacked bodies for its assembly line.

Another similar case of handling labor trouble was at Packard Friday morning. A few employees in the stamping division, dissatisfied because some men in the department were getting more money than others, staged a strike. Without loss of time, the foreman notified approximately 2500 other employees in the stamping and light car divisions to go home for the day.

Apparently the same policy was being followed at Chrysler, where the management said there had been a sit-down, but the union leaders declared that "the foreman became excited" and stopped the line. The president of Chrysler's local unit of the UAW said that four union members on the assembly line protested to the foreman at the employment of two non-union girls on the line and that the shut-down followed. Herman L. Weckler, personnel director, in his version of it, said that the motor assembly day shift sat down after demanding the dismissal of the non-union girls. Eventually the settlement which reopened the Jefferson, Kercheval and DeSoto divisions and put 12,000 employees back to work, provided for the discharge of non-union employees if they make remarks derogatory to the union.

A New Phase—The Skip Strike

The whole strike situation in the automobile industry has resolved itself into a queer kind of guerilla warfare, with the sit-down and slow-down just two of the varieties of strike being employed. Most disconcerting of all has been the skip strike, in which an unfinished car is permitted to travel to the end of the assembly line while matched fender rests, wheels or perhaps special order parts, such as steering wheels or accessories, accumulate alone the line for that car. Complete rerouting is necessary and with the elaborate Telautotype system that synchronizes the arrival of parts at necessary points on the assembly line, a lot of confusion and expense results.

In the course of these recent



strikes the workmen seldom knew much about the reasons for the strike because the UAW organizers have not, in most instances, consulted the men who were being told to sit down or walk out. The combined uncertainty as to what the union is doing and what the management will do has caused an apparent unrest in the rank and file. This easily observed situation now is complicated by the fact that the UAW is reported to be staging numerous departmental shut-downs to force payment of dues, in line, of course, with the departmental shut-downs earlier which forced men into the union. Incidentally, a rival union, which openly claims that it is more democratic than the UAW, collects regularly from about two-thirds of its members, its head admits, while the other third pay irregularly if at all, after signing up voluntarily.

Expect an Industry Policy

Now that the industry has taken more definite steps, adoption of a nation-wide unified labor policy by the entire automotive group is a possibility foreseen by Alfred B. Reeves, general manager of the Automobile Manufacturers Association. Executives of the industry met in Detroit during the last week at closed sessions. They heard William S. Knudsen, president of General Motors Corp., relate his first-hand experiences in the negotiations between the corporation and the UAW. Charles Fahy, chief counsel of the National Labor Relations Board, explained the application of the Wagner Act to the industry. Reeves, discussing the events that went on behind closed doors, said that the proposed uni-

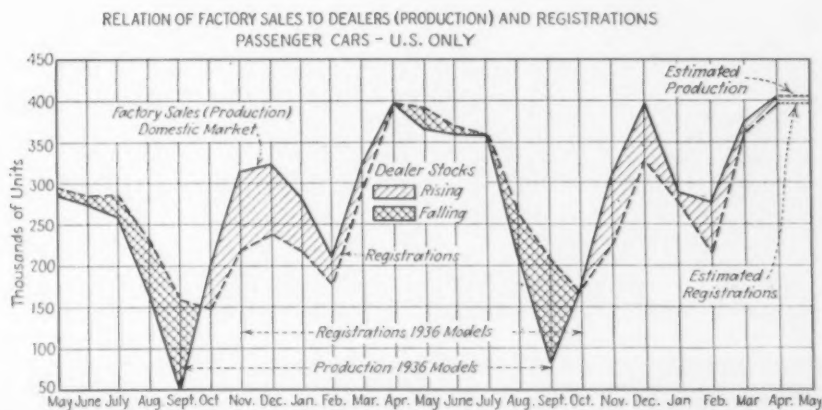
fied policy was strictly in line with the recent suggestion of Edward F. McGrady, Assistant Secretary of Labor, that all industries take such action. The suggestion was repeated by one of the automobile executives at the session, Reeves said and came during the general discussion between members on their individual labor problems. The association has not voted to adopt such a policy, he said, but he added, "It was generally agreed that its application to the industry would have to take into account differences in living costs throughout the country," thus hinting at a possible set of geographical labor scales to be adopted within the industry. Reeves quoted Fahy as saying that the Wagner Act does not force any employer to enter a signed agreement with any labor organization.

"This point was discussed by the various members for some time, after which it was decided that signed agreements, although not

compulsory, provide more protection to employers in the event of violation in subsequent appeals to the Labor Board," Reeves said. Other speakers at the sessions were Paul G. Hoffman, president of the Studebaker Corp.; Richard H. Grant, General Motors vice-president in charge of sales; Albert Levert, General Motors attorney; and Pyke Johnson, A.M.A. vice-president. Alvan Macauley, president of Packard, was re-elected to head the association, Alfred P. Sloan, Jr., was elected first vice-president and Mr. Knudsen was added to the association's board of directors.

Reflections of Steel Strife

The nation-wide steel strikes have had their effect in one plant in the Detroit area. At the Newton Steel Co., Monroe, Mich., subsidiary of the Republic Steel Corp., after a week of barricading by CIO pickets, the road leading to the plant was opened Friday by 18 policemen and seven sheriff's dep-



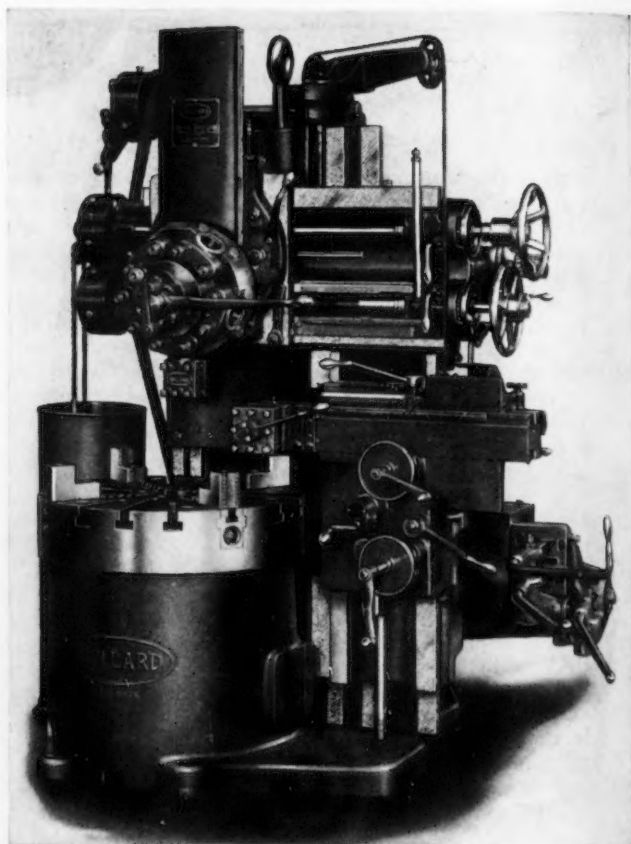
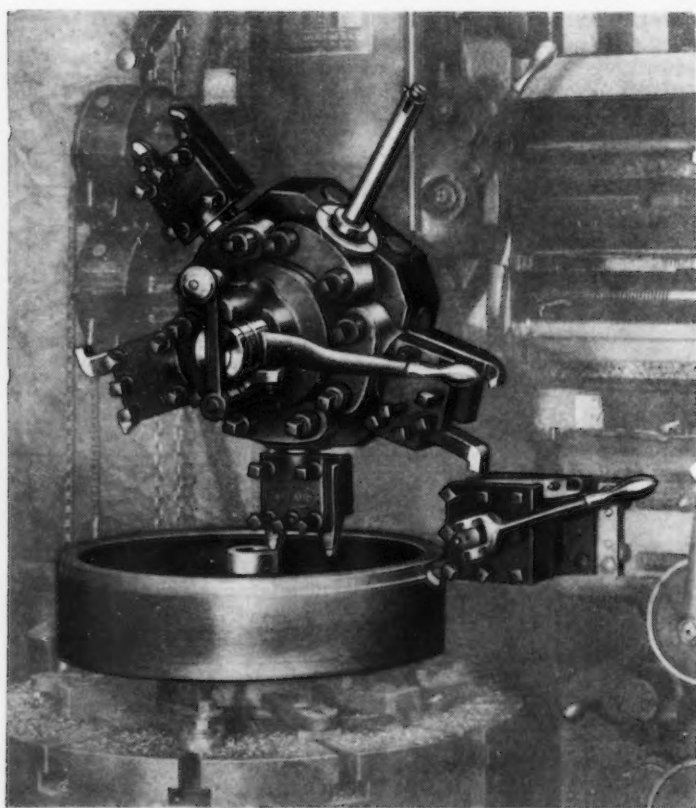
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uties, led by Monroe's mayor, Daniel Knaggs. No difficulty was encountered, the leaders of the pickets opening the road after conferring with the official group. A total of 1330 employees have been out of work since the strike started a week ago. Peaceful picketing at the plant will continue it is announced.

The Great Lakes Steel Corp., which has had no labor trouble so far, was the scene of an arrest Thursday night, and two employees were called before a one-man grand jury as a result. An automobile driven by one of the men and loaded with tear gas and gas masks was seized by county officials at the Great Lakes plant gates. The driver, who admitted being a former employee, insisted that he no longer worked there and denied any knowledge of how the contraband got into his car. The grand jury also heard William Neville, superintendent of Great Lakes service department. David Thompson, operating vice-president of the company, said the company had no knowledge of the equipment. The same grand jury, conducted by Judge Ralph W. Liddy, Common Pleas Court, has subpoenaed Edsel Ford and Harry Bennett in an investigation of the riot outside the gates of the Rouge plant more than two weeks ago. Bennett is reported ready to appear and Edsel Ford is said to be away from Detroit.

Senate Gets Murphy's Labor Bill

With amendments proposed by Maurice Sugar, CIO attorney, Governor Frank Murphy's Labor Relations Bill was approved by the Michigan House of Representatives late last week, 63 to 31, and sent to the Senate. Politically, the bill was regarded as a difficult one to handle and Democratic whips were cracked to pass it on to the Senate for corrective overhauling. One Republican, Ellis E. Faulkner, failed in an attempt to scrap it in favor of Murphy's original bill, which Faulkner said was fair to all interested parties and the public. As it stands, the bill no longer has the proposed civil service administration of the Labor Relation Board. It prohibits the so-called "yellow dog" contract, frees labor of the originally incorporated prohibition of interfering with or injuring workers in persuading them to join labor movements. However, the bill still includes an employer responsibility not to interfere with labor organizations. The bill provides strong guarantee for labor's right to organize and bargain collectively and definitely outlaws company unions. It still includes the Governor's proposal to grant the Governor, acting with the State

Administrative Board, emergency powers to take over factories involved in strikes, to operate them or to close them down. In the Senate, where the Republican-Democratic split is about even, the bill will probably undergo its first close scrutiny by the legislators.

Production Off Temporarily

The week's auto production held up remarkably well, considering the holiday on Memorial Day and the strikes scattered throughout the week. The week's output, however, slipped to the lowest level since the first part of April, when strikes in parts plants were curtailing production. According to Ward's Automotive Reports, passenger car and truck production in the United States and Canada last week totaled 106,136, compared with 132,425 in the previous week and 98,106 in the corresponding period of last year. Despite the seasonal lassitude which normally manifests itself at this time, probable production for the current week is 132,000. Losses during the past week were about evenly distributed among the Big Three. General Motors, because of the holiday, the Saginaw foundry strikes and Chevrolet's forced closing on account of lack of castings, slipped to 37,052 last week

from 53,890 the previous week. Chrysler turned out 23,930, compared with 29,975 the week before. Ford, again on the 4-day schedule, turned out 28,830. The previous week, also on a 4-day schedule, the Ford figure was 29,615. Similar reductions of about one-fifth in production were shown by most of the independents as a result of the holiday.

Tragedy which hit at a party celebrating the opening of a new shop by the Enterprise Tool & Die Co., causing one death and the serious illness of 70 people, many of them prominent in the automobile business has been blamed by medical men on food poisoning. The party, which was given a week ago in the new shop opened in a hangar at the Detroit Municipal Airport, resulted in the death of Karl S. Calkins of Ford Motor Co.'s purchasing dept. More than 300 guests attended and among those who became ill was Otto Proefke, president and treasurer of the company.

The second rivetless Ford motorship, the Norfolk, was launched Saturday at the River Rouge yards of the Great Lakes Engineering Co. This and the recently launched Green Island, all-welded ships, are the only two of their kind.



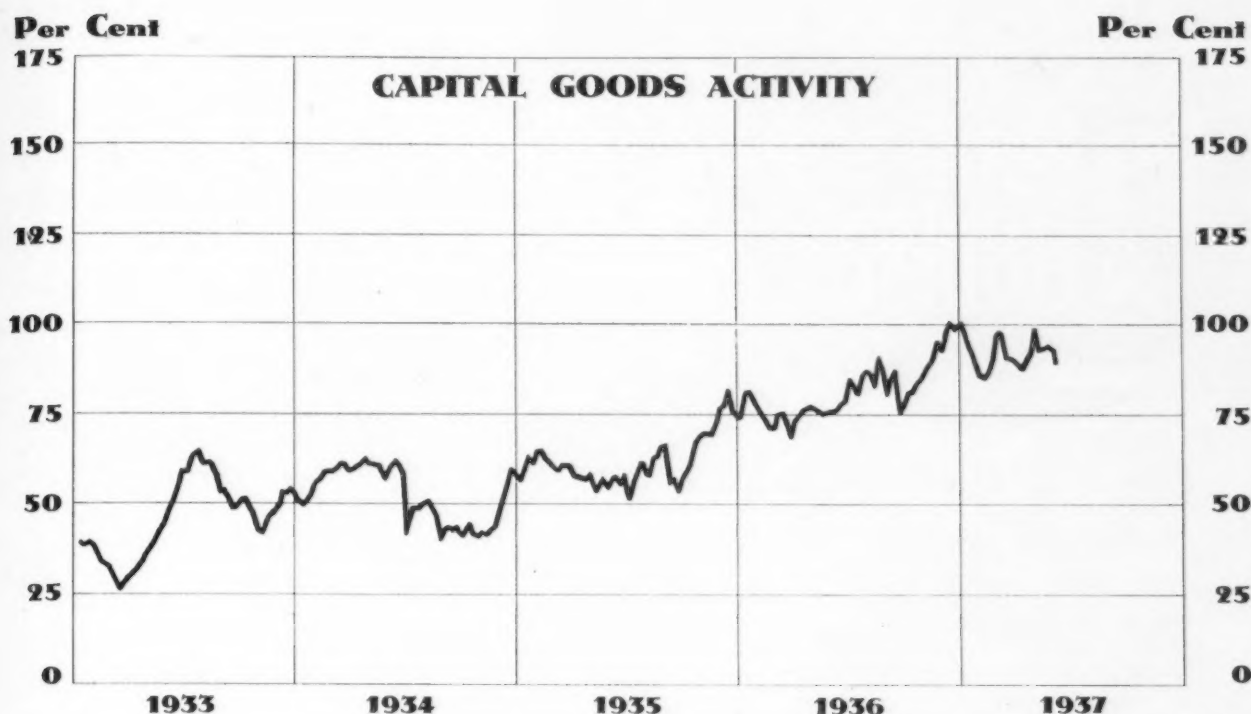
THE large eastern market will be supplied in the future by Chevrolet from its new Buffalo plant, for which ground was broken last week. On a mile-long plot of ground with 1320-ft. frontage on the Niagara River, a 818,000-sq.ft. manufacturing building will be erected by January 1938 for the manufacture of engines, axles and gear sets. Buffalo Chamber of Commerce officials, headed by President E. J. Schwanhauser, welcomed M. E. Coyle, Chevrolet president, who broke ground, and other Chevrolet sales and manufacturing executives.

Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available. Boldface Type Indicates Changes This Week.

	April 1937	March 1937	April 1936	Four Months 1936	Four Months 1937
Raw Materials:					
Lake ore consumption (gross tons) ^a	5,114,177	5,142,496	3,485,293	11,967,034	19,394,291
Coke production (net tons) ^b	4,655,226	4,849,363	3,554,617	13,665,166	18,417,802
Pig Iron:					
Pig iron output—monthly (gross tons) ^c	3,537,231	3,459,473	2,403,683	8,293,585	13,207,422
Pig iron output—daily (gross tons) ^c	114,104	111,596	80,125	144,849	221,551
Castings:					
Malleable castings—production (net tons) ^d	63,377	\$67,559	50,954	185,299	241,869
Malleable castings—orders (net tons) ^d	62,940	\$68,502	47,933	178,071	245,699
Steel castings—production (net tons) ^d.....	.....	.....	63,087	†143,926	.....
Steel castings—orders (net tons) ^d.....	.....	.....	83,188	†182,061	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons) ^e ..	5,071,875	\$5,216,666	3,942,254	13,295,237	†19,427,312
Steel ingot production—weekly average (gross tons) ^e	1,182,255	†1,117,577	151,625	768,955	†1,132,788
Steel ingot production—per cent of capacity ^e ..	90.27	†89.9	69.09	58.7	86.5
Finished steel:					
Trackwork shipments (net tons) ^f.....	.....	10,720	7,031	†13,740	†26,119
Sheet steel sales (net tons) ^g.....	.....	.....	190,269	†564,867	.....
Sheet steel production (net tons) ^g.....	.....	.....	217,975	†622,179	.....
Fabricated shape orders (net tons) ^h	148,152	†206,321	101,614	482,328	609,989
Fabricated shape shipments (net tons) ^h	136,042	†142,995	124,044	400,047	481,167
Fabricated plate orders (net tons) ^d	38,769	68,899	29,900	127,027	178,432
U. S. Steel Corp. shipments (tons) ^h	1,343,644	1,414,399	979,907	†2,181,281	†3,698,041
Ohio River steel shipments (net tons) ⁱ	101,720	122,100	74,110	270,162	408,390
Fabricated Products:					
Automobile production, U. S. and Canada ^k	553,415	518,977	527,726	1,644,622	1,855,724
Construction contracts, 37 Eastern States ^l.....	.....	\$231,245,900	\$234,631,600	\$553,973,800	\$662,347,200
Steel barrel shipments (number) ^d	970,749	995,407	743,291	2,463,863	3,610,184
Steel furniture shipments (dollars) ^d	\$2,462,687	\$2,515,169	\$1,633,633	\$6,290,024	\$9,224,355
Steel boiler orders (sq. ft.) ^d	674,248	1,516,128	783,961	2,807,388	3,696,275
Locomotive orders (number) ^m.....	.....	29	15	†73	108
Freight car orders (number) ^m.....	.....	6,200	3,650	†8,913	27,613
Machine tool index ⁿ	282.5	211.6	125.7	†109.4	†192.4
Foundry equipment index ^o	208.1	293.2	134.0	†117.4	†244.8
Foreign Trade:					
Total iron and steel imports (gross tons) ^p....	.....	51,802	49,277	†150,567	†136,493
Imports of pig iron (gross tons) ^p	11,469	10,720	11,982	65,418	45,963
Imports of all rolled steel (gross tons) ^p.....	.....	31,457	23,847	†63,212	†89,000
Total iron and steel exports (gross tons) ^p	671,746	570,584	301,987	1,016,764	1,735,009
Exports of all rolled steel (gross tons) ^p.....	.....	186,531	101,522	†237,719	†412,186
Exports of finished steel (gross tons) ^p.....	.....	173,428	90,116	†223,318	†381,111
Exports of scrap (gross tons) ^p	421,383	355,979	190,845	645,304	989,443
British Production:					
British pig iron production (gross tons) ^r	680,700	680,300	629,800	†1,813,800	†1,934,700
British steel ingot production (gross tons) ^r	1,080,400	1,109,500	*984,200	†2,831,100	†3,104,300
Non-Ferrous Metals:					
Lead production (net tons) ^s.....	.....	43,642	38,073	†105,573	†124,729
Lead shipments (net tons) ^s.....	.....	63,425	40,457	†104,419	†159,518
Zinc production (net tons) ^t	55,012	\$52,009	†43,180	†163,189	†183,052
Zinc shipments (net tons) ^t	56,229	59,635	42,311	†166,513	†214,044
Deliveries of tin (gross tons) ^v.....	.....	9,080	6,235	†17,755	†24,370

* Preliminary. † Three months' average. ‡ Revised.
Source of figures: ^a Lake Superior Iron Ore Association; ^b Bureau of Mines; ^c THE IRON AGE; ^d Bureau of the Census; ^e American Iron and Steel Institute; ^f National Association of Flat-Rolled Steel Manufacturers; ^g American Institute of Steel Construction; ^h United States Steel Corp.; ⁱ United States Engineer, Pittsburgh; ^j When preliminary from Automobile Manufacturers Association—Final figures from Bureau of Census; ^k F. W. Dodge Corp.; ^l Railway Age; ^m National Machine Tool Builders Association; ⁿ Foundry Equipment Manufacturers Association; ^o Department of Commerce; ^p British Iron and Steel Federation; ^q American Bureau of Metal Statistics; ^r American Zinc Institute, Inc.; ^s New York Commodities Exchange.



The Iron Age Weekly Index Numbers of Capital Goods Activity

(1925-27 Average = 100)

Last Week	89.3	Same week 1933	48.3
Preceding week	93.2*	Same week 1932	36.3
Same week last month	92.8	Same week 1931	67.9
Same week 1936	75.9	Same week 1930	101.2
Same week 1935	56.6	Same week 1929	126.6
Same week 1934	60.6		

ACTIVITY in the production and distribution of durable goods showed a drop of four points from the revised figure of the preceding week, according to THE IRON AGE seasonally adjusted index. A revision in the figure for the week ended May 29 was made as a result of the revised estimate of ingot production as a result of strikes in the steel industry. A further decline in ingot output is again reflected in the current figure for the week ended June 5. Automobile production fell 20 per cent, both as a result of the holiday and also because of sporadic sit downs and shut downs. Heavy engineering construction volume fell 37 per cent, but the decline was turned into a slight increase on the 13-week moving average used in the index. Gains were

recorded in the Pittsburgh indices of production and shipments unaffected by labor strife in the Youngstown and Chicago areas, and also in car loadings of forest products.

	Latest Week	Change from Preceding Week
Steel production (per cent of capacity)	77.5	-13.5
Automobile production (number of cars and trucks)	106,136	-26,289
Railroad loadings of forest products (number of cars) ..	42,675	+928
Pittsburgh industrial production and shipments (index number)	109.6	+0.7
Construction contracts awarded (total value)	\$35,606,000	-\$22,010,000

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

WASHINGTON



... Dictation to the Post Office by CIO leaders in Ohio cities as to what mails shall be permitted to go into strike-bound steel plants raises issue of insurrection or orderly government.

.

... Hearings on wage-hour legislation proposed by administration disclose fear of political control by five-man Fair Labor Standards Board.

.

... President William Green of A. F. of L. opposed to regulation of wages by Government—R. C. Kuldell of Hughes Tool Co. suggests gradual rather than sharp changes in present system.

By L. W. MOFFETT

*Resident Washington Editor,
The Iron Age*

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WASHINGTON, June 8.—The mails must go through! This inflexible creed has been instilled into every American. From the pony express to the airplane, he has been taught that United States mail is sacrosanct. Regardless of storms, banditry or any other natural or human force, the mails must reach their destination. The teaching has been more than a tradition. It has been a fact. Oftentimes its application has required courage. Outstanding is the high example set by Grover Cleveland in 1894 in the Pullman strike. He did not hesitate to send Federal troops to Chicago—and to send Eugene V. Debs to jail—to see that the mails went through.

No delivery of the mails? It could not happen here.

But it has happened here in this new day. Mail trucks actually attacked and held up. Ties chained to railroad tracks, and rails melted to prevent delivery of mail to industrial plants. Mails actually inspected by strikers before passed or refused delivery. It sounds fantastic. But it really happened here. Last Friday a telegram was sent to Postmaster General James A. Farley by the Republic Steel Corp. that postal authorities at Miles, Ohio, not only submitted to

inspection by CIO officials of mail to workmen in the company plant there, but to determine whether the mail should be allowed to enter the mills. Generously, the strikers, acting in the role of inspectors of United States mail, allowed some medicine to be delivered. But no newspapers, no food, no clothing! If this isn't literally anarchy, the absence of organized government, then the term has no meaning. And in Washington, Jesse M. Donaldson, Deputy First Assistant Postmaster General, approved the action of the Acting Postmaster Harry Dickson, at Warren, in refusing to accept foodstuffs for delivery to the Republic plant.

However he denied that mail was inspected by strikers.

"It has been our policy for 30 years to maintain only normal deliveries in troubled areas," said Mr. Donaldson. "That policy still stands." Only "regular" mail will be delivered, whatever is meant by "regular" mail. Just what can possibly be irregular about shipment of foodstuffs and clothing is for the oracle to answer. Or is censorship by the administration to be based on, not the character of the mail, but the sources to whom it

is addressed? And certainly if the censorship applies to foodstuffs and clothing it can be expanded to apply to all mail and to all recipients—or mail delivery can be entirely shut off and business and industry closed down and employment stopped with resultant chaos.

Mr. Farley has placed himself in a position of grave responsibility. Whether by legal or other action he will have to tell, without evasion, by what authority delivery of legitimate mail may be denied. And by what authority a striker, or a leader of a strike, may usurp the powers that rest only with postal authorities. And why the postal authorities did not take summary action and demand that the mails go through, meting out severe punishment to usurpers who "inspected" and held it up, after high-handedly disregarding the law. Yet the action was not only tolerated, it was approved. Equally as tolerant was the official attitude to the barring of ingress of the mails through obstructing the highway by chaining ties on the rails and by melting the rails, believable only because it happened.

It is an amazing spectacle. It remains to be answered. The an-

WITH A COMPLETE LINE

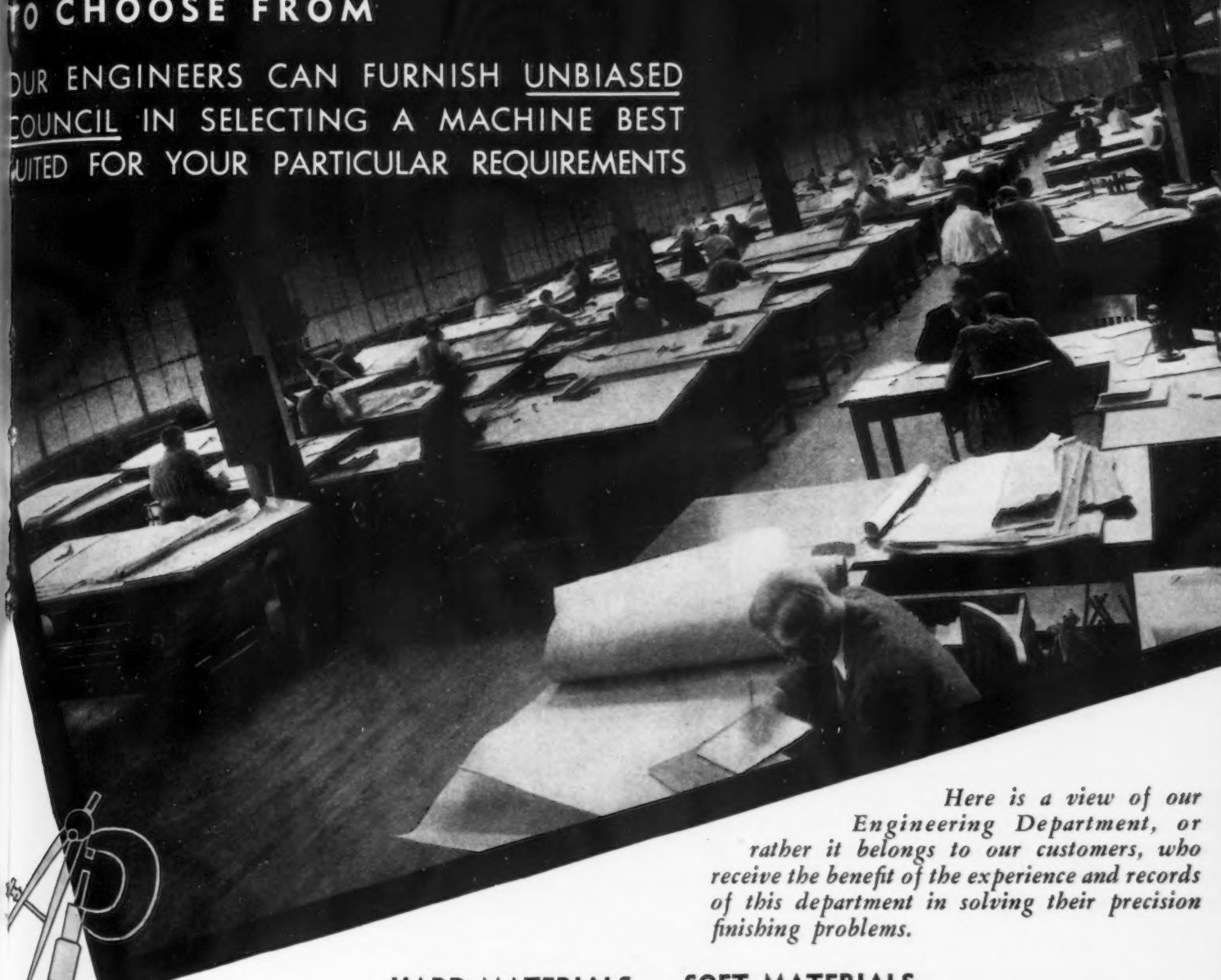
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THE *Heald*

MACHINE COMPANY,
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swer inevitably means either insurrection or orderly government—whether John L. Lewis's CIO or a duly constituted administration is at the controls. Political obligations owed to the administration for heavy financial support cannot possibly determine the issue. As for Mr. Lewis, it is up to him either to repudiate his riotous subordinates or to confess that he has lost control of them. Otherwise he will see his gradiose scheme of labor dictation of industry crumble into dust.

Postoffice Department Provoked

PROVOKED by newspaper criticism of the Postoffice Department for barring delivery of mail to struck plants of the Republic Steel Corp., Jesse M. Donaldson, Deputy First Assistant Postmaster General, on Saturday declared that steel companies are attempting to "force President Roosevelt to settle strikes in the mills" and directed a blast against the newspapers.

"It looks as if the papers have been hired by the Republic Steel Corp. and other companies to get the President to settle the strike," said Mr. Donaldson, who really was serious and not so humorous as might be suspected, considering the character of the statement.

Mr. Donaldson made it known that the department will not change its "traditional policy of 30 years" in refusing to handle mail in "troubled areas." The policy of the department, during that period, said Donaldson, has been to render aid to neither side in capital-labor disputes.

He declared that there had been a large increase in demand for mail deliveries of food in some strike regions.

Officials of the Postoffice Department denied official knowledge of reports of a protest said to have been sent to the department by the Republic Steel Corp. charging strikers with censorship of the mails. The only knowledge they had of such a protest, it was stated, was through newspapers.

Political Control Feared in Wage-hour Bill

IT is the possible political control that is the source of greatest objection to the administration's wage-hour bill. This has been clearly demonstrated at hearings on the far-reaching measure before the joint session of the Senate and House Labor Committees. The hearing will close next Monday when members of Congress will be heard. The bill as now drawn gives almost unlimited powers, whose constitutionality remain to be

tested, to the proposed five-man Fair Labor Standards Board, in fixing wages, hours and differentials. Its objectives quite naturally have met with general approval. But the manner of its administration is distinctly a matter of disturbance. While pictured as something that is entirely within the law and a beneficent instrument for legitimate industry by Robert H. Jackson, Assistant Attorney General, its possibility as strait-jacketing industry, a la NRA-plus, has aroused growing concern among industrialists who are entirely in accord with the principles of minimum wages and maximum hours and whose operations exceed any requirements of the bill.

Indicative of this attitude was

the testimony last Saturday of R. C. Kuldell, Houston, Tex., president of the Hughes Tool Co., maker of oil equipment. The company is owned wholly by Howard R. Hughes, renowned aviator and movie producer.

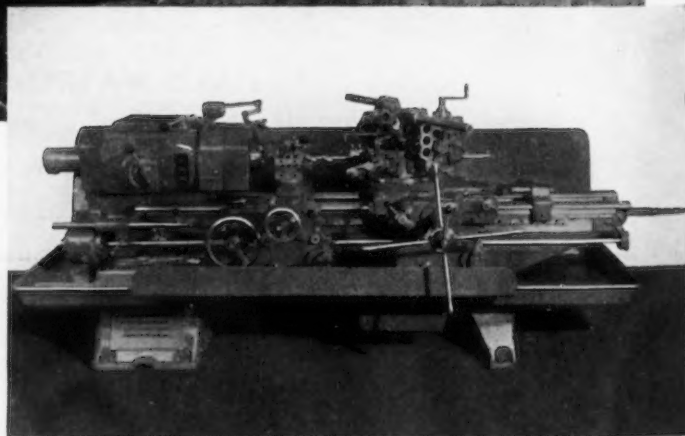
Expressing complete sympathy with the objectives of the bill, Mr. Kuldell nevertheless suggested that they be achieved by gradual steps rather than by sharp changes. He then made a pointed suggestion which is echoed generally by industry.

"I suggest," said Mr. Kuldell, "that the board administer the law as a doctor, not as a policeman."

Mr. Kuldell explained that the company employing 4000 workers maintains wage and hour scales



2½ x 40"
J&L
SADDLE
TYPE
TURRET
LATHE



that exceed requirements of the bill. The company, he stated, has increased wages of unskilled workers about 25 per cent since 1929, operates on an 8-hr. day, 40-hr. week schedule, with payment of time and one-half or double time for overtime, and provides holiday and vacation with pay. He said that it has been the experience of the company that, as wages are increased, the increase is often offset by better management, and less idling by the employees. But like management generally, Mr. Kuldell indicated apprehension lest the law be administered politically.

Secretary Perkins Favors Bill

Rather smugly, Frances Perkins, Secretary of Labor, told the Senators and Representatives that the legislation would stabilize basic la-

bor standards and remove them from "the arena of unfair competition," and give security to efficient management. She made a plea that undoubtedly carried considerable appeal, but, in urging wide control for the proposed Labor Board, did not remove the fear that it would be a politically dominated tribunal, with enormous powers whose exercise might well be disastrous to industry. She asked that the basic wages be left to the board, opposing rigid hour and wage standards by the law itself, and asked that employers and employees take part in hearings by the board. The board, she said, should fix standards only in industries where collective bargaining has been insufficient to secure reasonable standards. Minimum wages, she urged, should be estab-

lished on the basis of occupation and not sex. Nor would she exempt employers of a small number of employees as the bill proposes. Previously she had suggested that wage differentials be ignored. But in her testimony on the wage-hour bill she would leave the handling of this delicate subject to the board. She also omitted reference to separate boards for major industries, such as steel, automotive, coal and textile, though in appearing before a subcommittee of the House Committee of Judiciary the week before she had proposed separate boards. It is not necessary to labor the subject. It may safely be predicted that there will be boards, and subboards galore growing out of the legislation. There will be no lack of governmental bureaucracy or expenditures and annoyance.

William Green Is Critical

President William Green of the American Federation of Labor did not see eye to eye with Miss Perkins. Mr. Green was for the "principle" of the bill, but, evidently wondering what would be the necessity of unions if it is enacted as it stands, admonished that the A. F. of L. is against regulation of wages by the Government for men in private industry. He was consistent. For while the A. F. of L. swallowed the abortive NRA, which fixed minimum wages and maximum hours, his organization always has opposed governmental fixing of wages and hours. Mr. Green reiterated that the Government should withdraw from regulation of minimum wage and maximum hours as collective bargaining expands. He approved the application of minimum wages to the limited class of workers whose annual incomes are \$1200 or less and recommended an hourly minimum wage of 40c. In the list of amendments he proposed he asked that the legislation make it certain that collective bargaining is encouraged and not supplanted by the Government. He also recommended that the basic 40-hr. week be reduced gradually to a 30-hr. week. Evidently taking a shot at the CIO and as a matter of protecting the A. F. of L., Mr. Green also proposed an amendment that "whenver the board finds employment, or employees in any occupation to be covered by its investigation or order, is of a character generally recognized as craft employment, the investigation and order must in each case deal with such craft employment as a separate classification."

Venturing into another field of hot dissension, Mr. Green, again



An Introduction To PROFITS

There is no easier way of increasing profits than by reducing costs—and no easier way of reducing the cost of your turning work than by installing new J&L Universal Turret Lathes.

Some of the features that will reduce your costs are the triple-purpose hardened steel ways, with full length guards. They assure accuracy over a great many years. Single lever controls are used throughout the machine. They lessen the operator's duties and give him an

easier, yet more productive, day. The quick-indexing square turret is supported over the ways even at maximum distance from the chuck. This results in complete rigidity. Coolant is distributed automatically as each face of the turret is brought into working position. No attention from the operator is necessary.

May we send a J&L engineer to study your turning problems and introduce you to greater turning profits?

JONES & LAMSON MACHINE COMPANY

SPRINGFIELD, VERMONT, U. S. A.

consistent with organized labor tradition, said that if it became apparent after the legislation is enacted that it was causing increased imports, "Congress should immediately act to raise tariffs."

The Question of Imported Goods

This point reflects the only difference between the wage-hour bills of Senator Black of Alabama and Representative Connery of Massachusetts, chairmen, respectively, of the Senate and House Labor Committees. The House bill would require the same labor standards on the production of imported goods as it requires of the production of domestic goods. The administration is opposed to the Connery provision, and, while she does not always speak for the adminis-

tration, Miss Perkins reflected its view when she said she opposed vesting in the Labor Board powers of fixing standards of wages and hours as applied to imports. But she said she would have no objection to giving the same power to the President—a power he would not exercise if it were given to him. Senator Black is unalterably opposed to the provision and said, if necessary, he "certainly would fight it." Favoring standards for domestic manufacturers and opposing their application to foreign manufacturers doesn't add up, but it is a good bet that the Connery provision will be struck out before the legislation is enacted. Its enactment seems probable, though the legislation will face a real and possibly a long battle, and after some

revision. It is proposed to conclude hearings the present week.

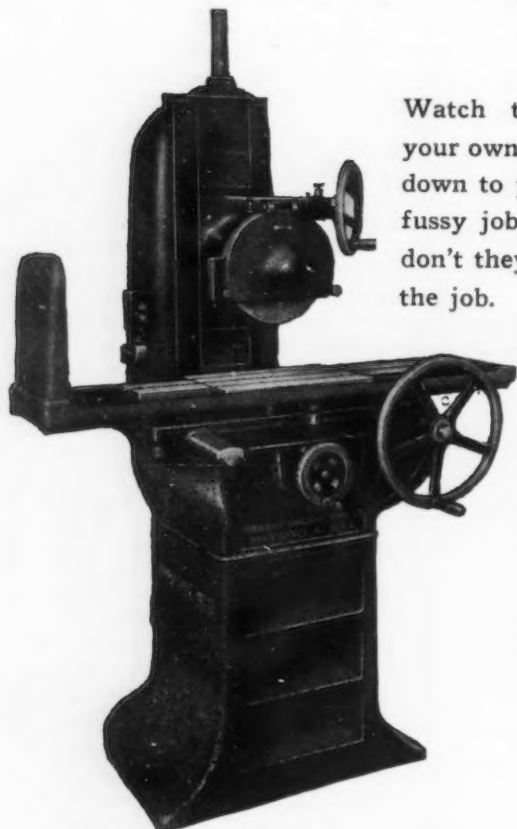
Industrial Coordination Abolished

REMEMBERED chiefly for its rows with industries and thus running counter to its euphonious name, the office of Coordinator for Industrial Cooperation will fade out on June 30. Announcement of the forthcoming demise of the W.P.A.-supported organization was made last Friday by Senator Berry, of Tennessee, who before his appointment to the Senate was the "coordinator." Berry made the announcement after a conference with President Roosevelt.

Carnegie-Illinois Labor Case To Be Dismissed

WILLIAM BYE, counsel for the Carnegie-Illinois Steel Corp., formally notified the National Labor Relations Board last Friday that in compliance with an agreement with it, the company has posted notices for 30 days in its plants of disestablishment of its employee representation plan and made a motion that the board's complaint against the company be dismissed. Acting Chairman Edwin S. Smith of the Board announced that an appropriate order of dismissal will be issued as soon as the board receives an official report from its regional director in Pittsburgh.

THERE IS NO COMPROMISE WHERE ACCURACY IS CONCERNED



Watch the skilled tool-makers in your own shop when they want to get down to plus or minus nothing on a fussy job. They do it by hand feed, don't they? They want the "feel" of the job.

The No. 1½ ABRASIVE

allows the operator to get this "feel" of his job, and in addition, it has the capacity for the large work which ordinarily must go to much more expensive tools.

Capacity 15"x10"x12"
12"x½" wheel

Write for Circular

ABRASIVE MACHINE TOOL CO.

E. Providence, R. I.

1936 Lead Output Gains 25 Per Cent

OUTPUT of refined primary lead from domestic ore in the United States in 1936 amounted to 387,698 short tons, with a value of \$35,668,000, according to the U. S. Bureau of Mines. Compared with the 1935 production of 310,505 tons, valued at \$24,840,000, this was an increase of 25 per cent in quantity and 44 per cent in value. Production of refined lead from foreign sources amounted to 11,458 tons, compared with 14,055 tons in 1935.

Lead production, in net tons, last year was divided as follows: desilverized lead, 228,486; soft lead, 111,750; and desilverized soft lead, 47,462.

For engineers, designers, draftsmen and others, the New Departure division of General Motors Corp., Bristol, Conn., has issued a set of 19 sheets containing full size drawings of ball bearings for layout work. Single row, double row, radax, duplex and self-sealed bearings are included in a complete range of sizes for all series.



Ex-Cell-O Precision Thread Grinders

To produce threads of materially greater accuracy, at production costs which compare favorably with less accurate methods now in common use: this was Ex-Cell-O's objective in its years of developing and perfecting the Ex-Cell-O Precision Thread Grinders. Now it is possible to grind from solid hardened blanks and to hold lead error to .0002" per inch. Use of the wet grinding method and long-life 18" wheels makes for extreme accuracy and grinding wheel economy.

An important feature of these Precision Thread Grinders is their flexibility, their adaptability to a wide range of work including either right or left-hand threads on screws, taps, chasers, or worms, both as gauges and production parts. Complete information will be mailed upon request.



EX-CELL-O CORPORATION • DETROIT, MICHIGAN



..PERSONALS..

A. L. SONNHALTER has been appointed president of the Pittsburgh Crucible Steel Co., succeeding F. B. HUFNAGEL, who continues as chairman and president of the Crucible Steel Co. of America, the parent company. Mr. Sonnhalter has been with the Pittsburgh Crucible Steel Co. since 1922, at which time he was an open-hearth superintendent at Midland, Pa., later serving as assistant general superintendent, general superintendent, and since 1932, vice-president in charge of operations. Prior to the time he became connected with the Pittsburgh Crucible, he was identified with the American Steel Foundries from 1908 to 1912 and in 1913 entered the open-hearth department of the Illinois Steel Co. In 1914 and 1915 he was employed as assistant open-hearth superintendent of the United Alloy Steel Corp. and from 1916 to 1922 as

open-hearth superintendent for the old Carbon Steel Co. in Pittsburgh.

♦ ♦ ♦

H. B. SPACKMAN, formerly general sales manager of the steel products division of the U. S. Gypsum Co., Chicago, has been appointed general sales manager of Lyon Metal Products, Inc., Aurora, Ill. In his new position, Mr. Spack-



A. L. SONNHALTER

man will have supervision of all sales activity, including advertising and sales promotion.

♦ ♦ ♦

J. R. LUBY, heretofore chief metallurgist of Follansbee Brothers Co., has been appointed metallurgist in charge of electrical sheet production of the Empire Sheet & Tin Plate Co., Mansfield, Ohio. Prior to becoming chief metallurgist for Follansbee, he was electrical sheet engineer for that company.

♦ ♦ ♦

T. P. ALDER has retired as vice-president and treasurer of the United States Steel Products Corp., New York. He is being succeeded as vice-president by A. C. MUNDLE, and as treasurer by C. E. THOMAS.

♦ ♦ ♦

E. B. NEWILL, heretofore chief engineer and director of research of Frigidaire division, General Motors Corp., has been promoted to assistant general manager. S. M. SCHWELLER, who has been assistant chief engineer, has been made chief engineer and director of research.

♦ ♦ ♦

CLAIRE L. BARNES, president of Houdaille-Hersey Corp., Detroit,

Do you need SPACE in your Stockrooms or Tool Cribs?



This shows how ROTABINS can be installed in your own shelving.

Pioneers in the development, design, manufacture and installation of sectional rotating bins.

Are they crowded?

Do they need expanding?

Do they need relocation?

Are you planning new ones?

Do you want to save Time and Space?

IF SO

Rotabin sectional rotating steel shelving will help to solve these problems.

Rotabins save 40-60% of floor space.

They increase present floor space capacity and can be used with present shelving.

Write us for information. No obligation.

THE FRICK-GALLAGHER MFG. CO.
WELLSTON OHIO

automotive parts manufacturer, has been elected chairman of the board, a newly - created office. CHARLES GETLER, formerly vice-president, has been named president. DONALD S. DEVOR, vice-president and general manager of the General Spring Bumper Corp. and executive vice-president of the Oakes Products Corp., both Detroit subsidiaries of Houdaille-Hersey, has been named vice-president of the general corporation, as has RALPH F. PEO, vice-president and general manager of the Houde Engineering Corp., Buffalo, a division of the Houdaille company. Another vice-president elected is MELVILLE C. MASON.

MAURICE E. NICHOLS, for the past eight years dean of Fenn College, Cleveland, has joined the American Steel & Wire Co., Cleveland, as superintendent of training. He will supervise the company's training activities in its plants throughout the country. Mr. Nichols has had a wide experience in both industry and education. He received a bachelors and masters degree from Western Reserve University and after spending some years in industry joined the staff of Fenn College in 1927, becoming

dean of engineering in 1935. Mr. Nichols is to carry on and develop to even a greater extent the training courses which the Steel & Wire company has provided for its employees.

LOUIS ALLIS, founder and president of the Louis Allis Co., Milwaukee, received the honorary degree



M. E. NICHOLS

of doctor of electrical engineering by Pennsylvania Military College, Chester, Pa., at commencement exercises on June 8. Mr. Allis was graduated with *summa cum laude* honors in 1888. He is the youngest son of the late Edward P. Allis, founder of the present Allis-Chalmers Mfg. Co., Milwaukee, and has operated his own business for nearly 35 years.

JESSEL S. WHYTE, formerly secretary and treasurer of the Macwhyte Co., Kenosha, Wis., manufacturer of wire rope, has been elected president to succeed his father, George S. Whyte, who has been elected to the newly-created office of chairman of the board. ROBERT B. WHYTE, brother to the former president, and for many years general manager of manufacturing, has been elected to the board of directors. H. E. SAWYER, a director and general sales manager, has been elected vice-president and treasurer.

CHARLES R. UNDERHILL has been elected president, Brown Fence & Wire Co., Cleveland, to fill the vacancy caused by the recent death of Frank Spitz. He has been con-

SPECIALLY ENGINEERED FOR THE JOB



Five of these special drives were designed and built by Farrel to drive five stands of forming rolls of an Electric Weld Tube Mill. Each drive transmits 150 H.P. Three pairs of Sykes continuous tooth herringbone gears provide a ratio of 113 to 1. The pinion unit for connecting the drive with the rolls is built integral with the drive.

The gear cases are all cast steel of heavy section for maximum strength and rigidity. All shafts are mounted in anti-friction roller bearings. Gears are process hardened for wear resistance and long life. The gears are lubricated by built-in sprays and bearings are flood lubricated, oil being supplied to both gears and bearings by a central lubricating system.

The successful operation of drives like these is the result of modern design, modern materials and modern methods of construction, properly combined and applied by engineers and mechanics who have a thorough knowledge of the problems involved. Their extensive experience may be helpful in solving your drive problems.

FARREL-BIRMINGHAM COMPANY, INC.
100 Main St., Ansonia, Conn. — 333 Vulcan St., Buffalo, N. Y.

nected with the company about 20 years. M. B. SACKHEIM, who had been treasurer, has been elected vice-president, and CHARLES O. HODGE, secretary, has been given the additional duties of treasurer.

JOHN C. CAMPBELL, president, Newark Wire Cloth Co., completed his 60th consecutive year as a wire cloth maker on April 2. Mr. Campbell is still active in the affairs of the company.

K. L. HANSEN, Harnischfeger Corp., Milwaukee, was elected chairman of the Milwaukee section of the American Welding Society at a meeting held on May 27. Mr. Hansen is widely known to men in the electrical world and has been active for many years in connection with the American Society of Electrical Engineers as well as the American Welding Society. Harold Falk of the Falk Corp., Milwaukee, Wis., was elected vice-chairman of the Milwaukee section of the society. J. J. CHYLE, of the A. O. Smith Corp., was elected secretary and treasurer.

JOHN WILBUR has been appointed to the Cleveland office of Electro Metallurgical Sales Corp. Following his graduation from Yale University in 1933, Mr. Wilbur was first associated with the Niagara Falls works of the Electro Metallurgical Co. For the past year and a half he has been with Electro Metallurgical Sales Corp. in its New York office.

EDWARD W. RISTAU has been elected vice-president of Skilsaw, Inc., Chicago, and will continue the work of the past five years in directing sales, advertising and promotion.

JAMES W. RYAN, works superintendent of the Westinghouse porcelain plant at Emeryville, Cal., received the distinction of being the first employee in the Pacific Coast district to have the silver Westinghouse award of merit bestowed on him on May 4.

W. C. JOHNSON has been placed in charge of the Knoxville, Tenn., office of the Allis-Chalmers Mfg. Co., Milwaukee. This office will operate as a branch of the company's Chattanooga district office, of which D. S. KERR is manager.

HENRY I. BOUCHARD has been added to the Detroit sales force of the Federal Products Corp., Providence, to supplement the work of C. G. GILBERT. R. T. PALMER, the

company's New England agent, has opened an office in Rochester, N. Y., at 241 Powers Building, with ROBERT B. HAWKINS in charge.

C. W. GILMER, heretofore manager of sales in Seattle, mechanical goods division of the United States Rubber Products, Inc., New York, has been transferred to the New York office as belting sales engineer. L. F. KOEPP, formerly salesman in the Seattle district, has been appointed manager there.

J. S. FANNING has been appointed assistant to ROGER A. MARTIN, sales representative in the Atlanta territory for the Yarnall-Waring Co., Philadelphia.

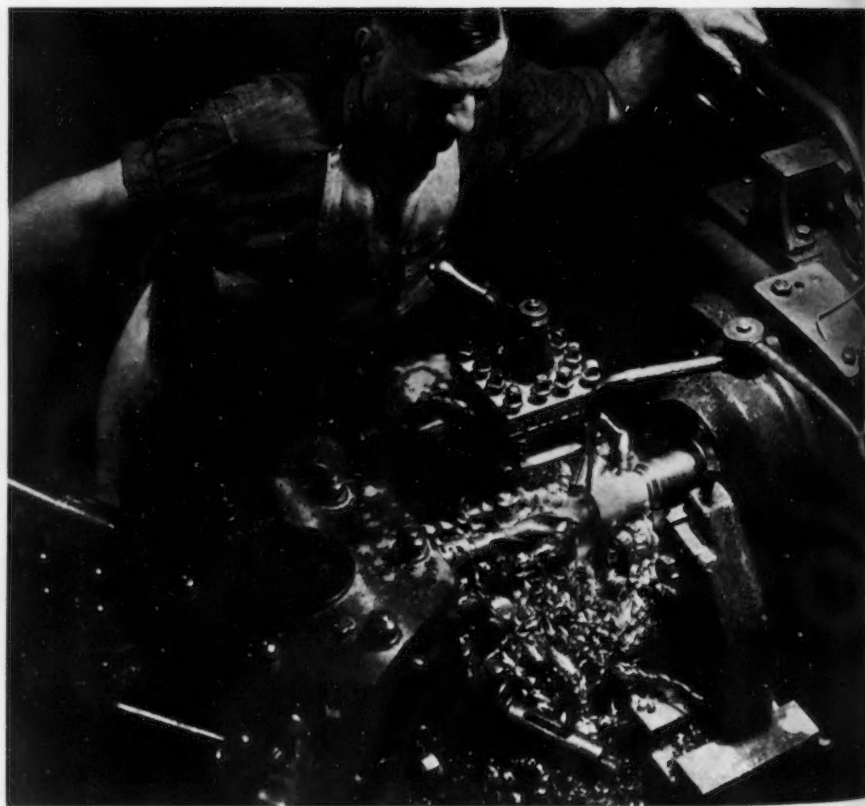
Mesta Machine Co., Pittsburgh, has received the contract from John Summers & Sons Co., England, for a blooming mill, a hot strip mill and a cold strip mill with all accessories. The plant will be built near Liverpool, according to reports. Detailed information on the award is not available yet as final plans have not been decided upon.

...OBITUARY...

FRED H. WHITMAN, chief engineer of Dodge Brothers from 1913 to 1920, was entombed at the Grand Lawn Cemetery June 3. Mr. Whitman, who died May 31 in Milwaukee, where he had been for the last 10 years, was credited with the design of the first Dodge sedan. After leaving Detroit in 1920, he went to Indianapolis with the firm that built the old National automobile, then did engineering for the Holmes Air Cooler, Canton, Ohio. Afterwards he joined the A. O. Smith Corp., automobile frame builder, in Milwaukee. He was 57 years old.

JULIUS KNECHT, a veteran experimenter in automobile body building, was buried June 3 at Detroit. He was 53 years old. For 12 years he was with the Chrysler Corp. and was foreman of the

Would You Mind...



Chrysler experimental body division when he became ill four years ago. Previous to his connection with Chrysler he was in the Dodge Brothers body division for five years.

❖ ❖ ❖

J. J. BEVER, for 30 years manager of the steel foundry of Otis Steel Co., Cleveland, previous to his retirement, died May 31, aged 75 years. A native of Germany, he came to the United States in 1873. He joined the Otis company in charge of foundry sales in 1899 and later was appointed foundry manager, retaining that position until his retirement in 1930.

❖ ❖ ❖

FRANK THOMSON, Cleveland office manager, American Steel & Wire Co., died May 31, aged 54 years. He had been connected with the company for 26 years. Previous to his transfer to Cleveland eight years ago he was assistant manager of the fence department in Chicago.

❖ ❖ ❖

HERMAN LUTTER, one of the founders of the Lutter & Gies Co., Milwaukee, and widely known as an expert designer and manufac-

turer of machine tools and special machinery, died on May 26, aged 80 years. With Ernst A. Gies, who survives, Mr. Lutter established the company in 1887 and operated it until 1926, when they disposed of the business to the Milwaukee Press & Machine Co. and retired.

❖ ❖ ❖

WILLIAM J. T. DAVIS, comptroller of the Truscon Steel Co., Youngstown, for the last two decades and a native Detroit, was buried at Youngstown on June 4. Mr. Davis was born in 1866 and was employed until 20 years ago by the Wabash Railroad.

❖ ❖ ❖

OTTO C. ROHDE, vice-president and chief engineer of the Champion Spark Plug Co., Toledo, died June 2 at Indianapolis of injuries received May 28 at the Indianapolis Speedway. Mr. Rohde was hit by a race car while he was standing in one of the pits during the preliminaries to the 500-mile speedway race. The driver of the car, Overton Phillips, of Middletown, N. Y., lost control of it after the gas tank caught fire. Mr. Rohde, a member of the Society of Automotive Engineers and of various mechanical and electrical

engineering groups, was born in Michigan and was graduated by the University of Michigan. He had been associated with the Champion company 22 years and was one of the founders of the Champion company's 100-Mile-an-Hour Club, an organization of drivers who have averaged more than 100 miles an hour in the Indianapolis race.

British Remove Other Duties on Steel

LONDON (*Special Correspondence*)—The British Treasury has issued, on the recommendation of the Import Duties Advisory Committee, an additional import duties order providing for the amendment of the schedule on iron and steel goods, consignments of which are exempt from additional duty when imported with a certificate of origin, and a quota certificate under the provisions of the Finance Act, 1936, and an additional import duties order of 1937.

The effect of these amendments is to exempt from additional duty as from May 27, 1937, consignments of the following descriptions of goods which are accompanied by the prescribed certificates:

Ingots, blooms, billets, and slabs the value of which exceeds £7½ per ton.

Angles, shapes, and sections of which the value exceeds £15 per ton.

Bars and rods of which the value exceeds £9 per ton.

Plates, sheets, hoop, and strip of which the value exceeds £16 per ton.

Other consignments of such goods are subject to the existing duties.

In its report, the committee says that, owing to the world-wide rise in steel prices, prices of the lower quality products which form the bulk of imports under the agreement with the Continental Cartel have exceeded, in some cases, the value limits. As a result the reduced rate of duty is not available in such cases, and the flow of imports is being restricted.

Steel Statistical Report Issued

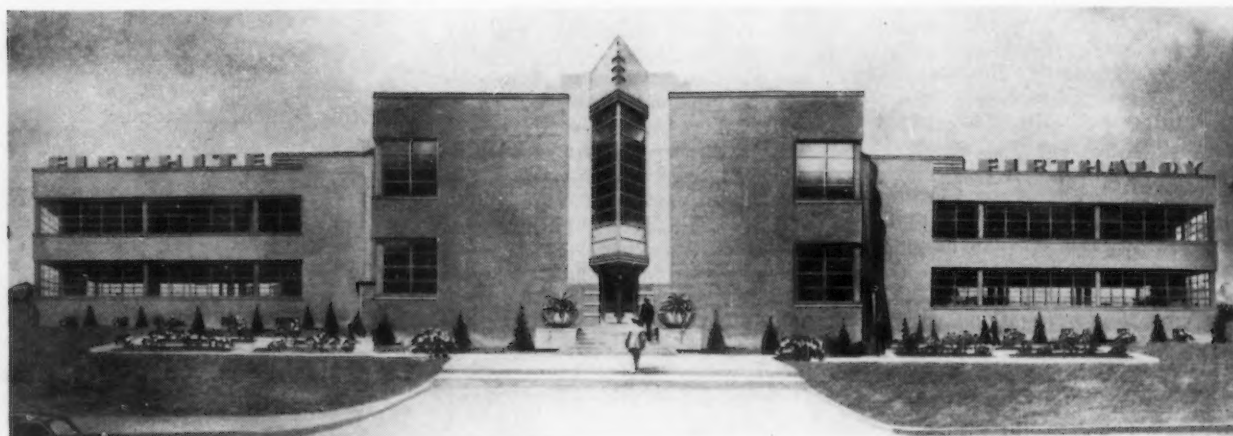
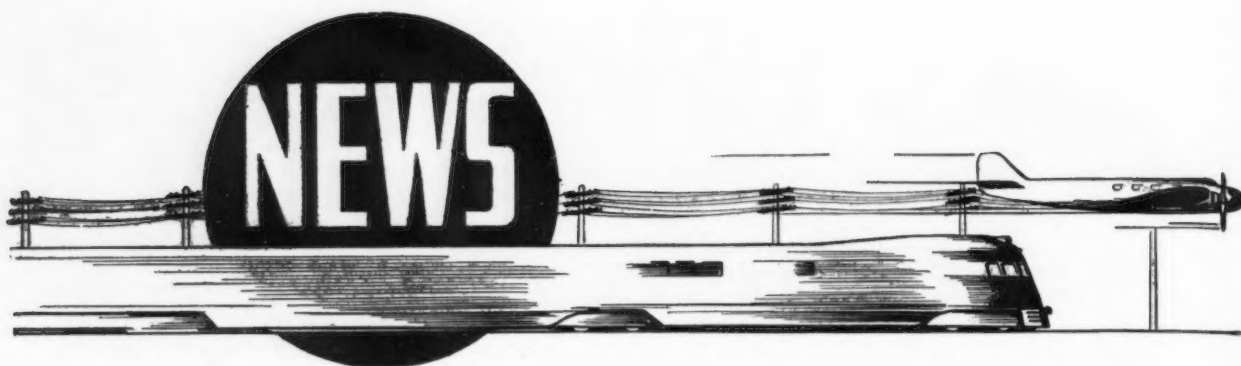
THE American Iron and Steel Institute, 350 Fifth Avenue, New York, has issued the annual statistical report for 1936, giving complete production and related data for that year.

IF WE SAVED YOU MONEY?

- Machinery maker, Chicago—operations formerly spread over 10 machines were consolidated on 1 Warner & Swasey. Cost per piece cut from \$1.20 to .42c.
- Electrical manufacturer, New York State—formerly used several machines on a shaft turning job, switched to a new Warner & Swasey turret lathe and saved \$2000 a year.
- Drill bit manufacturer, Pennsylvania—output on old machine 32 drill bits a day. A Warner & Swasey now turns out 53 per day.
- Railroad machine shop—saved 30% on 26 standard machinery jobs by replacing a collection of old machines with 3 new Warner & Swasey Turret Lathes.

It only costs a postage stamp to get the dollar-and-cents proof of what a new Warner & Swasey would save you!

**WARNER
&
SWASEY**
Turret Lathes
Cleveland



Firth-Sterling Opens New Plant for Manufacture of Sintered Carbides

THE opening last week of the new Firthite Firthaloy sintered carbide plant of the Firth-Sterling Steel Co., McKeesport, Pa., marked the tenth anniversary of the company's first experience with this unusual form of metal, which has taken its place in machining applications along with

commercial diamond, super-high speed steel, forged tool and die steel, and cast tool and die alloys. This plant is said to be the largest in the world devoted exclusively to the manufacture of tungsten carbides and carbide tools.

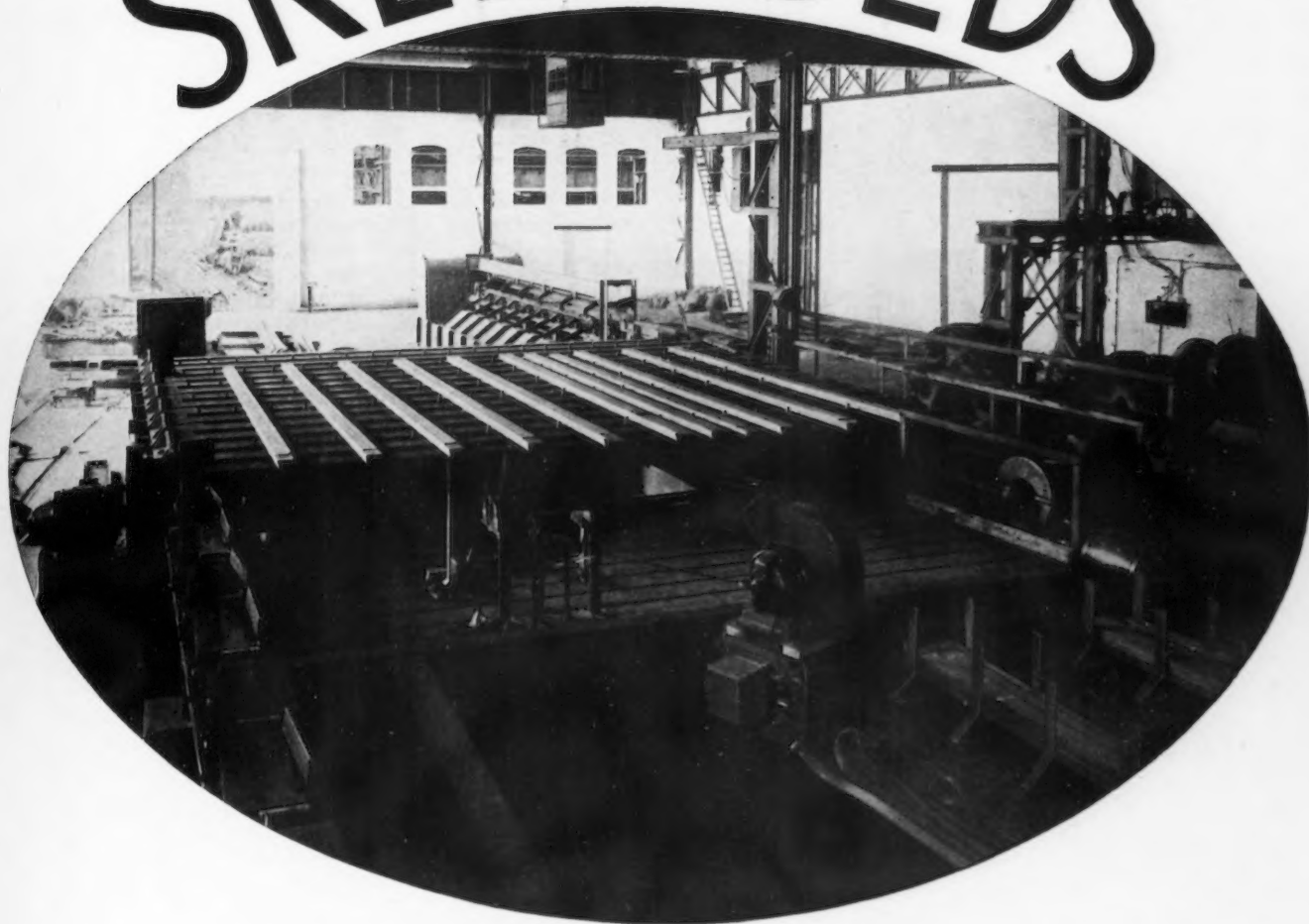
The new building has been designed to permit efficient and or-

derly production and the elimination of wasteful handling of materials and time losses. Many departments have been equipped with the most modern machinery and equipment, essential to the intricate processes of manufacture of the product. Designed and built by the Rust Engineering Co., Pittsburgh, the building is two stories high, the main section being 220 ft. long and 70 ft. wide. An office wing extends from the center and contains a lobby and display room. Glass brick is used for stair wells and interior par-

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SKELP BEDS



by Morgan

The Skelp Bed as developed by Morgan solves the problem of handling sheared skelp at high speeds.

As skelp leaves the finishing stand, a rotary shear cuts it into the lengths required. In order to reduce the speed of the sheared skelp, it is *shingled* automatically on the run-out table. Pinch rolls then pile the skelp on the bed in

neat stacks, which are then conveyed across the bed to a scale bin where the weight of each is recorded automatically.

Skelp Beds by Morgan, together with Billet and Merchant Mill Cooling Beds,

all prove the thoroughness, the exacting attention to every minute detail, that characterizes each Morgan development.



R23

MORGAN CONSTRUCTION CO. • WORCESTER, MASS., U. S. A.

THE IRON AGE, June 10 1937—71

titions, and offices are soundproofed by using air separated double glass wall as partitions.

A tool and die shop occupies the first floor of the main building, but the second story provides the most unusual angles from the standpoint of industrial design. On this floor are the sintering furnaces in which the carbides are produced. Since finely pulverized materials are used in the process, dust becomes a problem. As a single particle of dust or foreign material may cause a defect and rejection

of an otherwise perfect tool or die, it is absolutely essential that no dust accumulate in the adjoining finishing room, so this room has a terrazzo floor, walls of Carrara glass, and a linoleum ceiling. This combination permits the entire room to be washed quickly and easily. Both rooms are provided with a dust filtering ventilation system as an added protection. Provision has also been made for the future installation of an air conditioning system.

There are also two laboratories

and a ball mill room located upon the second floor. This noisy mill room has been soundproofed 85 per cent.

The Manufacturing Process

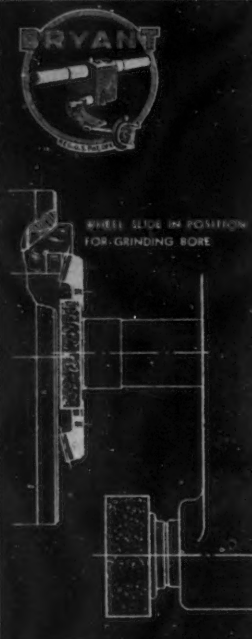
Sintered carbides are made from extremely fine powders of tungsten, carbon, and cobalt mixed together, pressed in a mold to form a blank or tip, then sintered in a hydrogen furnace at a temperature above the melting point of the binder. This treatment unites the small particles and forms a blank extremely hard. With these tools only the cutting tip is made of tungsten carbide, which is attached by brazing to the shank of the tool, made of a less expensive metal; whereas, with regular tools, the entire shank as well as the tip is made from the more expensive steel.

The first step in the manufacturing process of the sintered carbide is the carburizing of the powders, after which they are transferred to the mixing room. The carburizing is accomplished by heating a mixture of carbon powder and metallic tungsten powder to a high temperature in a non-oxidizing atmosphere. The resultant carbides are crushed by ball milling and returned to the mixing room where they are combined with tantalum carbide, titanium carbide, and cobalt powders. These are then mixed in various proportions to produce the different grades.

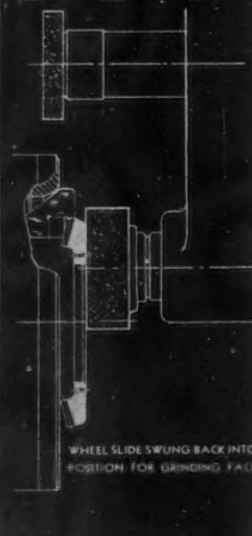
Distilled water is added to the charge and later the milled charge is brought back and the greater part of the water filtered off. The powder is then dried in controlled baking ovens, mixed with cobalt powder and delivered for a final ball milling.

In the ball milling room the process is entirely mechanical and the charges are rolled or tumbled continuously for days. Another purpose of milling is to coat the hard particles of carbide with a metal binder such as cobalt and the operation must continue until every particle is coated to an extent that will give the desired binder content in the finished product. When the milling is complete, the charge goes back to the mixing room where all trace of water is removed.

The powder mixture is then pressed. The proper quantity of powder mixture is weighed in accordance with the piece to be pressed and the mixture is then spread uniformly in a mold or die. All molds are made in sizes and shapes to produce pieces approximately 20 per cent larger than



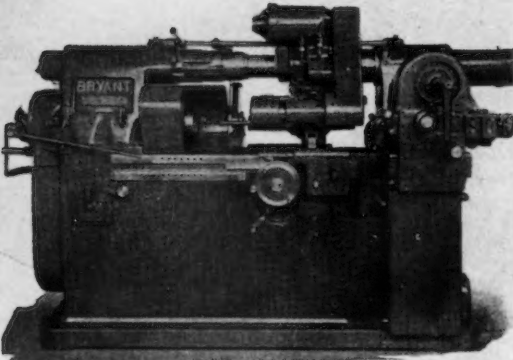
WHEEL SLIDE IN POSITION FOR GRINDING BORE



WHEEL SLIDES WING BACK INTO POSITION FOR GRINDING FACE

Two Surfaces or more!

AT ONE CHUCKING
OF THE WORK



The 16-A Two Spindle Bryant Grinder shown above is especially adapted for grinding two or more surfaces of work where it is important to have these surfaces true and concentric with each other.

The line illustrations show grinding the bore and face of a ring gear at the same chucking. Grinding the hole and face of this gear in this manner assures a high degree of accuracy at a maximum production.

BRYANT

CHUCKING GRINDER CO.

Springfield, Vermont

the finished product, owing to shrinkage in all dimensions in the final sintering.

The compacted piece is next given a preliminary heat treatment by putting it through a "pre-sintering" furnace having three electrically heated sections in which a hydrogen atmosphere is maintained throughout. The fragile blocks are placed upon graphite slabs and heated to a temperature at which the metal particles coalesce and make a somewhat less fragile piece with a chalk-like hardness. The piece when cooled is then ready for shaping.

After the piece is shaped, it is ready for sintering, the process of heating to the melting point that metal in a compound which melts first and thus becomes a binder for the other unmelted particles. The heating chamber of the special furnaces for sintering designed to insure a hydrogen atmosphere, is an alundum tube, wound with a resistance wire (molybdenum) which permits accurate control of temperature. A water cooled section adjoins the heating tube so that rate of cooling is also controllable. The shaped pieces are packed in carbon "boats" which are introduced in a pre-heating section of the tubular furnace and then mechanically stoked or pushed through the heating and cooling sections. After sintering, the pieces have attained their final hardness and are ready to be used in a tool or die. Each six pound batch is carefully controlled for hardness, specific gravity, resistance to cross breaking stress, and microscopic structure.

Carbides are then sent to tool or die shops for final processing. In some cases the carbide blank or nib is usually mounted in a holder or a casing and the accepted method of securing is by brazing. The finished carbide products are made into either cutting tips or are for drawing or forming uses by being made into finished dies.

Five hundred members and guests of the Association of Iron and Steel Engineers are expected to attend the inspection trip being conducted by this society, to the new 100-in. semi-continuous plate mill of the Carnegie-Illinois Steel Corp., Homestead, Pa., on the afternoon of June 23. In the evening there will be a meeting of the association at the William Penn Hotel, Pittsburgh, where a symposium on flood control and rehabilitation will be presented. This meeting will be preceded by an informal dinner at 6.30 p. m.

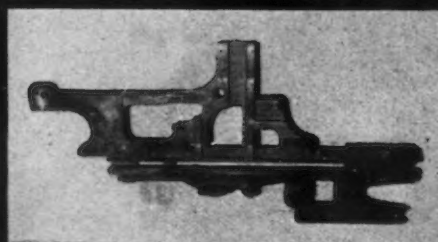
Many Steel Plant Extensions Under Way in Great Britain

LONDON—(Special correspondence).—British iron and steel concerns continue to push ahead with development projects in order to cope with the ever-increasing demand for material, and more a producing plant is expected to be ready for operation during the next three months.

Important additions to plant are being carried out by Thomas Firth & John Brown, Sheffield. Although this firm's electric steel plant is already claimed to be the largest in Europe, it is adding another high-frequency furnace and is also building an additional Siemens open hearth furnace. In



SUPER-SERVICE RADIALS



INTERTYPE CORPORATION

Saves 2 Handlings and Speeds up Production nearly 20% . . .

• Fifteen months ago the Intertype Corporation modernized drilling, reaming and tapping operations on cast iron face plates for typesetting machines by installing five Super-Service Radials.

Production time per piece has been reduced from 47.7 minutes to 41.7 minutes. Where three handlings were formerly required, all operations are now performed in one handling.

Quoting Mr. C. E. Bittner, Works Manager, "The high spindle speeds permit us to drill small holes faster and straighter. We have been able to discard a single purpose drill press."

If more and better work at lower cost per piece interests you, modernize drilling, tapping and reaming with Super-Service Radials. Write for detailed information.

THE CINCINNATI BICKFORD TOOL CO., OAKLEY, CINCINNATI, OHIO

CINCINNATI BICKFORD

order to meet the demand for high mechanical accuracy, new and modern bar rolling mills have been installed. These mills will chiefly roll the special alloy steels which all sections of the engineering trade are now using more extensively. Serving these mills are new heat treatment, finishing and inspection shops, which will insure a uniformly high standard of quality. The firm's engineers' tools department is now being extended for the third time since it was opened three years ago. More than \$5,000,000 has been spent by the Firth-Brown organization on augmentation and modernization of plant during the past four years, of which \$1,950,000 was spent last year.

Hadfields is another Sheffield

firm with large extensions underway. In connection with re-heating and heat treatment, two continuous gas-fired annealing furnaces are being installed. These will eliminate a number of older coal-fired furnaces, and will each be capable of handling an hourly output of two tons of castings.

Important extensions and improvements are also proceeding at the Vickers works of the English Steel Corp., where a reorganization and reconstruction project, involving the expenditure of over \$10,000,000 has been carried out since 1932. Expansion here is almost continuous, and the need for it has been increased by the demands of the Government's rearmament program. The firm is

also reconstructing its Grimesthorpe plant.

Northeast Coast steel firms also have big development schemes in hand. The new steel mill at the Skinningrove Iron & Steel Works is nearing completion, while an additional mill is shortly to be started at the Cleveland works of Dorman, Long & Co. In addition, the South Durham Iron & Steel Co. is soon to start a new mill at West Hartlepool, while this firm has just started up a new battery of coke ovens at Seaton Carew.

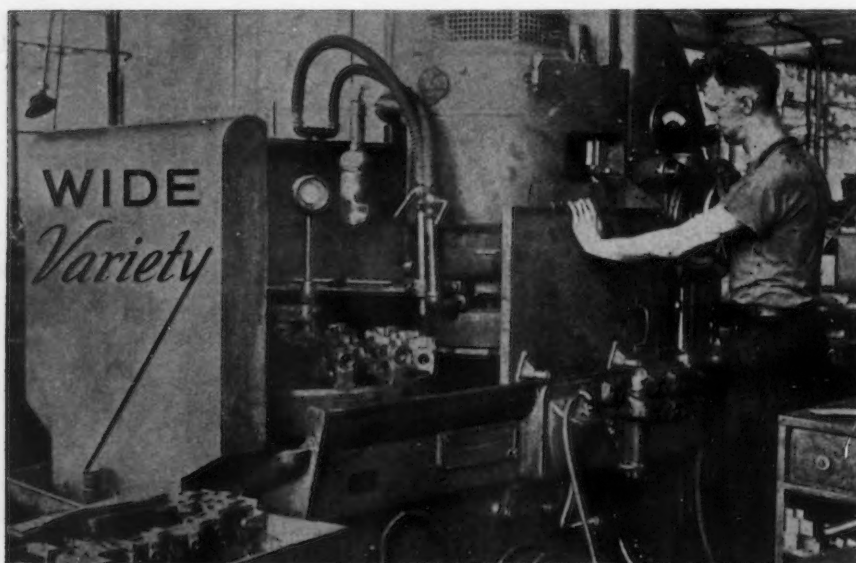
In Scotland Colvilles have in hand a project for the extension of their iron and steel works at Glasgow and Motherwell, which constitutes by far the biggest development scheme ever undertaken in the Scottish iron and steel industry. The project embraces the establishment of coke ovens, the erection of two new blast furnaces and additional steel-works plant at the Clydebridge broiling mills. The two blast furnaces will have a capacity of 1000 tons of pig iron per day, and the battery of coke ovens to be installed will probably be capable of carbonizing 1000 tons of coal per day, producing approximately 800 tons of metallurgical coke.

The largest project of all is that of Richard Thomas & Co., who are constructing a great new steel works at Ebbw Vale, Wales. Such good progress has been made in preparing the site that it is expected that the first blast furnace will be lit in July.

Approximately \$30,000,000 is to be spent on the construction of this new steel works, a special feature of which is the American strip mill—the first of its kind in the United Kingdom. The massive scale of the work may be judged from the fact that 4000 tons of steel bars have been used for reinforced concrete. Already 6000 tons of steel work has been erected to form the skeleton of the building on the site.

Scullin Steel Plan up to Court July 15

UNITED STATES DISTRICT JUDGE DAVIS, St. Louis, has set July 1 as the last day for filing objections to the modified plan for the reorganization of the Scullin Steel Co., St. Louis. The court will hear arguments on July 15 for approval or rejection of the plan, which the company was authorized to submit to creditors and stockholders.



These gear housings are typical of the wide variety of small cast iron and steel parts which can be ground better on a Blanchard No. 18 Surface Grinder.

Gear Housings
10 in. long
1-16 in. stock
cast iron
ground on 1 surface

Limits
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smooth surface required
for oil tight joint

Production
50 pieces per hour

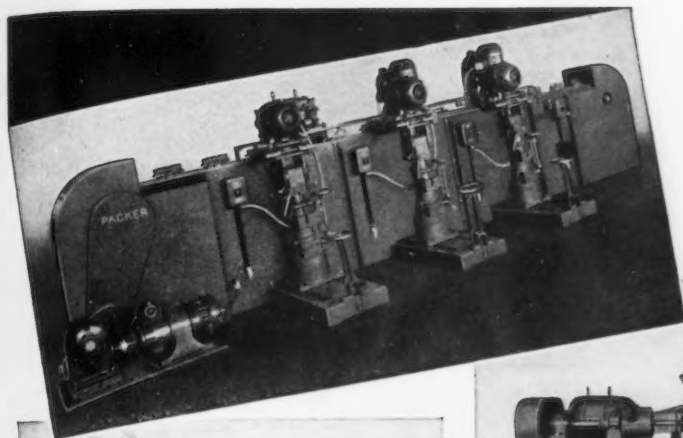


The Blanchard Magnetic Chuck holds these housings securely.

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in volume
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Packer Automatic Polishing and Buffing Machines are made in three general types—Rotary, Straight Line Conveyor and the Portable Vertical Type.

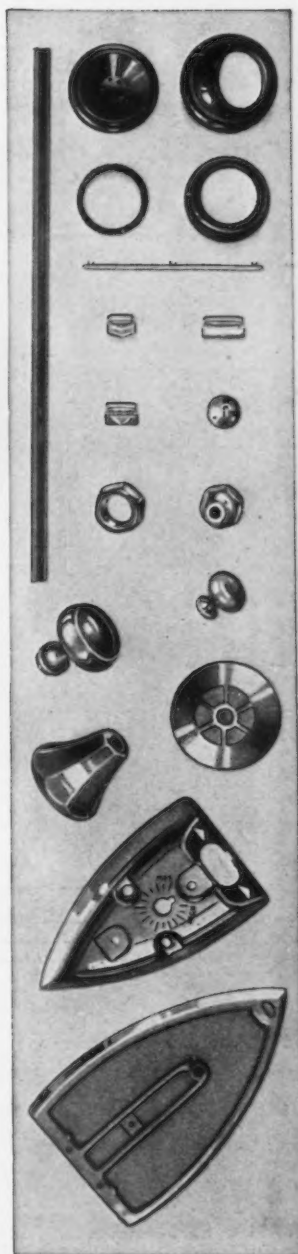
Illustrated are a few of the many shapes and sizes that are successfully Polished and Buffed on Packer "Automatics," and at a decided saving in "hour cost."

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or send a sample of the finish required and production desired, and a definite proposal will be sent without obligation.

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CATALOG.**

Lamson & Sessions Co. Honors Employees With 54-Year Records

HONORING 12 men who have been employed continuously by the company for 50 years or more, the Lamson & Sessions Co. gave a testimonial dinner June 5 for about 300 employees and guests at the Hotel Cleveland, in Cleveland. This company is one of the three largest manufacturers of bolts and nuts in the United States, with headquarters and two of its plants in Cleveland.

The 12 employees with half century records of continuous service have worked for this one employer

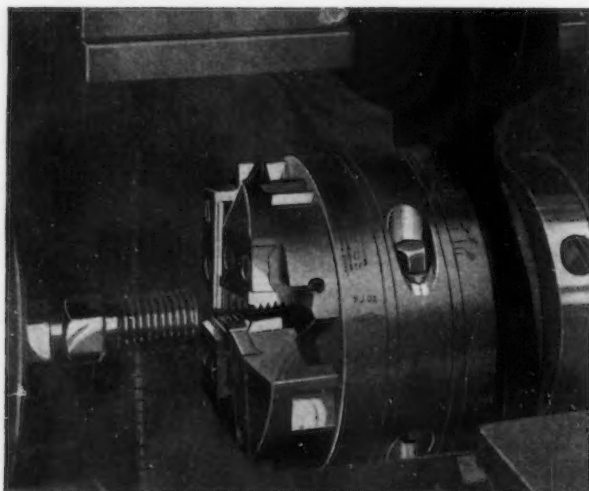
for a total of 650 years or an average of 54 years each. Six have been employed for 50 years and the six others have a total service record of 349 years. Included in the latter six is John G. Jennings, chairman of the board, whose service record is now 54 years. Louis Brown, machinist, heads the list with 67 years of service and some time ago won the Ohio State title of longest employed in the service of one company.

Length of service of other employees with service records ex-



JOHN G. JENNINGS
Chairman of the Board
54 years service

LANDEX Heads for Automatic Screw Machines



Are your profits based on low production cost? If so, remember the LANDEX Head will insure maximum production at minimum cost and will show the way to increased earnings.

The LANDEX Head employs the patented LANDIS Tangential Chaser which permits faster threading speeds with a minimum of chaser wear. Faster speeds, longer life and increased accuracy are characteristic features of LANDEX Head performance on automatic screw machines.

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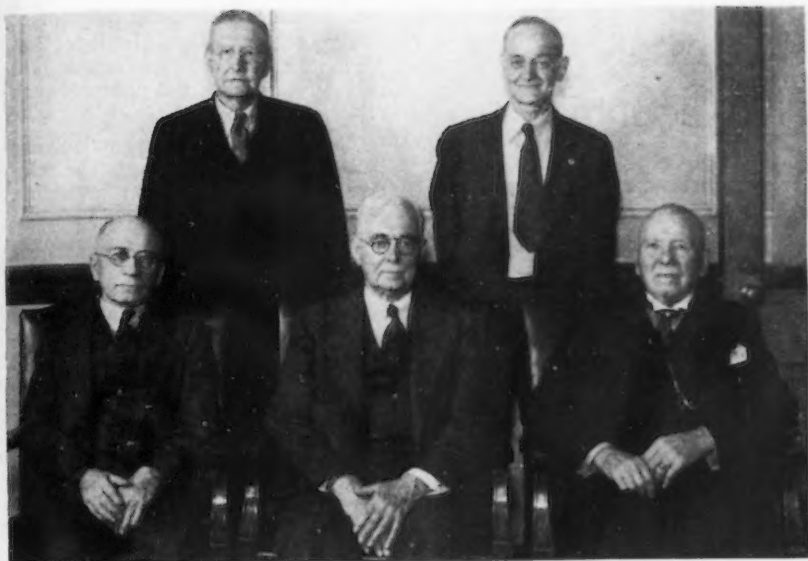
ceed 50 years ranges from 56 to 59 years. In addition, there were present at the dinner six pensioned former employees who had worked continuously for the company from 50 to 57 years and seven now on pension whose service records range from 42 to 49 years.

Included in the group of men whose service records range from 25 to 50 years are George S. Case, president, with 33 years of service, and I. L. Jennings, vice-president, with 30 years of service.

There were also at the testimonial dinner about 70 others whose record of continuous employment with the Lamson & Sessions Co. ranges from 25 to 49 years, as well as others who had been employed by the company 15 years or more and junior members of the organization in point of service.

With a man's length of employment now restricted by child labor and school laws and social security pensioning at the age of 65, it is estimated that continuous service hereafter will be practically limited to 47 years, few starting to work younger than 18 years of age and most men retiring at 65. With the present limitations of periods of employment by legislation, it seems doubtful whether the record established by the Lamson & Sessions Co. will ever be equaled in succeeding years.

Ripley in a recent "Believe it or not" cartoon stated that five employees of one company had a total



UPPER, LEFT TO RIGHT
Wm. J. Stevenson, 56 years
Bernard Sherry, 57 years

LOWER, LEFT TO RIGHT
Geo. Dennerle, 56 years
Alfred B. Bower, 59 years
Louis Brown, 67 years

service record of 267 years. The five having the longest service records at the Lamson & Sessions plant total 295 years, or 28 years more than Ripley's example of the unusual.

Gold medals were presented at the dinner to the men having 50 years or more of service and silver medals to employees having 25 years or more of service with the company.

Sheet Jobbers Merge As Reliance Steel

A MERGER of five companies engaged in warehouse business in sheet and strip steel seconds has been effected under the name of the Reliance Steel Corp., recently organized in Cleveland. The companies joining in the merger are the Midwest Steel Co., Chicago, Modell-Friedman Steel Corp., Detroit, with a branch in Toledo, the Reliance Steel Corp., Detroit, Friedman Brothers & Co., Inc., Cleveland, and Bancroft Steel Co., Inc., Worcester, Mass. The Reliance company in Detroit has handled prime sheets and the Bancroft company in Worcester both primes and seconds. Activities of the other plants have been confined to seconds.

At the head of the company as

president is Sol Friedman, who has been manager of Friedman Brothers & Co., Cleveland. He is also the treasurer. Paul Friedman of Cleveland and the men who have been at the head of the various companies that are being merged are vice-presidents. Philip D. Brown is secretary. The company's main office will be located at 1170 Ivanhoe Road, Cleveland, where buildings have been acquired providing ample warehousing facilities.

The company will have 32,500 shares of \$1.50 convertible preference stock, par \$25, and 240,000 shares of \$2 par common stock. While a small stock offering is contemplated, ownership will be largely held by holders of stock in the constituent companies.

Dynamic Balance



RIVETT attains real precision for the enclosed bench lathe with "Dynamic Balance" of every rotating part. Spindles are rigid and vibrationless at all speeds. Other standard characteristics for lasting precision are: maximum slide areas, three-point bed mounting and slide rest shoe which always squares with center line. Operating features of value are: splash lubricated speed box drive, standard constant speed motor giving 18 spindle speeds, replacement of driving belts without disassembly of spindle or removal of head, and hinged cover to permit turning of spindle by hand.

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PIONEERS IN BENCH

LATHE & GRINDER INC.

BRIGHTON, BOSTON, MASS.

LATHE DEVELOPMENT

International Scrap Cartel is Now Functioning for 10 Countries

LONDON (Special Correspondence).—There are 10 parties to the international scrap agreement—the United Kingdom, Germany, Austria, Czechoslovakia, Hungary, Italy, Poland, Rumania, Sweden and Jugoslavia. Japan, the

largest purchaser of foreign scrap, is not a party.

With Japan outside the agreement, the international "cartel" really amounts to a European cartel with France as the most important non-participating country. The

real significance of the agreement lies in the fact that 10 important European scrap purchasers are now buying with, not against, each other.

The purchases of the cartel are being allotted according to the relative needs of the member countries. No fixed percentages have been decided upon for the different countries. In this connection it is noteworthy that of the 625,000 tons of scrap purchased from the United States by the Raw Materials Committee of the British Iron and Steel Federation (for delivery before the last quarter of the year) the United Kingdom will receive the lion's share—probably about 300,000 tons. The share of Italy, the largest world purchaser in the cartel, will be far smaller.

The American transaction was financed by a levy on the tonnage purchased on common account, and distribution will be at fixed prices. The material will cost above £5 (\$25) per ton, against the fixed price of £3.7s. (\$16.75) for British domestic scrap.

Scrap Trend Dominated by U. S.

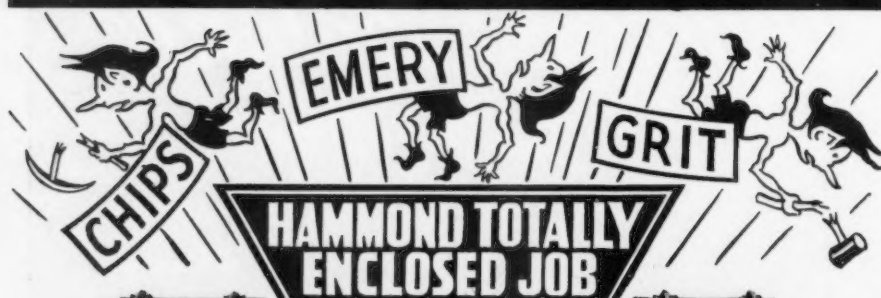
The trend of events in the United States appears likely to prove the dominating factor in the British scrap market for some time to come. In Europe, as the American transaction illustrates, the members of the steel cartel are cooperating in the purchase and distribution of available scrap supplies. All the chief consuming countries now discourage scrap exports and many have placed an embargo on such exports. The United States offers the one big free market for European consumers.

Any legislative action to limit American scrap exports would, of course, have an immediate effect on the British scrap situation. Greater supplies would have to be drawn from domestic sources, and this would press heavily in the direction of general price increases. British policy at present is definitely to restrict prices.

So far the scrap cartel has held three meetings, the inaugural meeting being held in Paris on March 11, and being followed by one in Venice in the second week of April. The last meeting took place at Dusseldorf on April 26 and the next meeting is scheduled for London on an unnamed date in June.

The writer has been informed by the British Iron and Steel Federation that British imports of scrap and waste metal from the United States during the first four months of 1937 amounted to approximately 60,000 tons, out of a

BANISH these Imps of Motor Destruction



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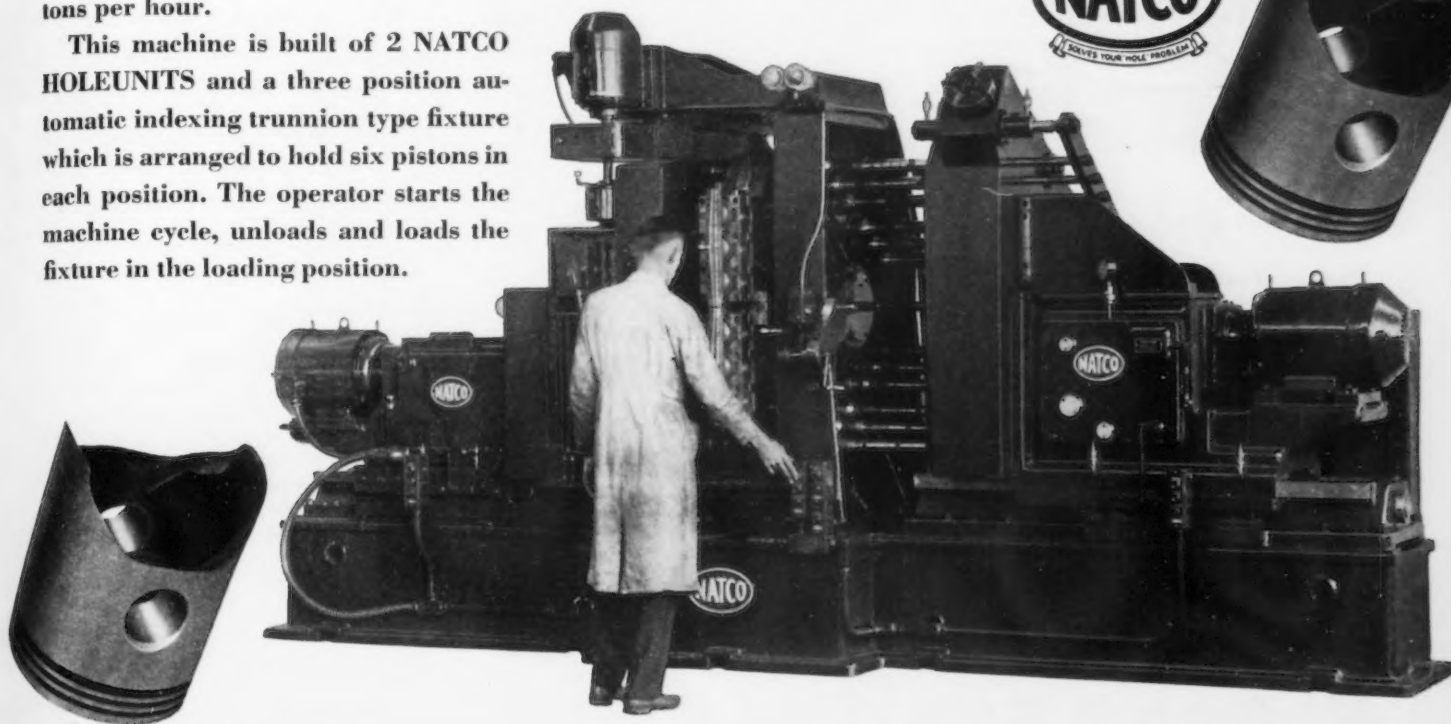
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450 Pistons are Bored and Reamed Per Hour by this NATCO Machine

The NATCO two-way machine shown below is being used by a prominent automobile manufacturer to single point bore, chamfer and align ream the wrist pin holes in 450 to 500 cast iron pistons per hour.

This machine is built of 2 NATCO HOLEUNITS and a three position automatic indexing trunnion type fixture which is arranged to hold six pistons in each position. The operator starts the machine cycle, unloads and loads the fixture in the loading position.

Yes, we believe this is a good example of combining operations on a multiple of parts to reduce production costs. Investigate the possibilities of NATCO HOLEUNITS today.



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It's the little savings . . . here and there in your production line . . . which build up your profits. NATCO Engineers will be glad to go over your various drilling, boring and tapping problems. Without any sort of an obligation on your part we will make a careful survey and make our recommendations . . . then you be the judge as to whether we can increase your profits. Send

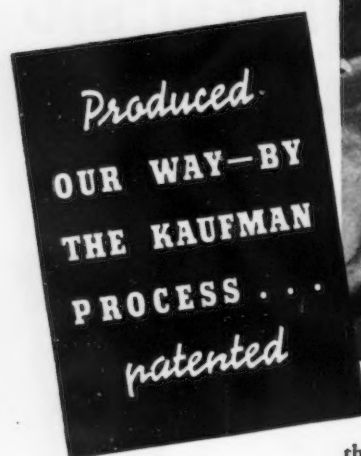
in prints of your work or call a NATCO representative today.

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PHILADELPHIA . 12th & Olive Sts.
NEW YORK . . . 47 Murray Street
LOS ANGELES . 1015 East 16th St.

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To get the precise degree of temper . . . plus uniform coating so essential to accurate fit and quality workmanship with galvanized sheets, specify **SUPERIOR**. They have long been the first choice of shops specializing in quality work.

THE SUPERIOR SHEET STEEL CO., Canton, Ohio
Division of Continental Steel Corp., U. S. A.



total of about 126,000 tons imported from all sources. This figure is considerably lower than that for the corresponding scrap imports from America last year, but it does not take into account the cooperative purchase of the cartel.

Prices of Scrap Fixed

In the United Kingdom the domestic scrap supply is controlled by an agreement reached in February. This agreement, designed to release scrap held up in anticipation of a rise in prices and to check the entry of foreign buyers into the market, is now working smoothly.

As a result the British scrap trade has been placed on a commission basis. Fixed prices for delivery of tonnages have been drawn up. These prices vary slightly for different districts, but the following is a typical list for heavy mild steel for melting:

Heavy steel, over 250 tons . . .	£3.7.0 per ton
Heavy steel, below 250 tons	
to 100 tons	£3.6.0 per ton
Heavy steel, below 100 tons	
to 50 tons	£3.5.0 per ton
Heavy steel, below 50 tons . . .	£3.4.0 per ton

All concerns belonging to the National Federation of Scrap Iron and Steel Merchants may sell direct to the steel works on the above basis.

It will be observed from the above table that the plan is designed to bring out big tonnages. Small concerns will be able to sell small lots to other scrap merchants at prices above the list and tonnages can then be combined to make a total delivery above the minimum. The margin for inter-merchant transactions has been fixed at one shilling (24c.) per ton. Having established the selling prices for scrap, the British Iron and Steel Federation has agreed to allow certain buying differentials to the associated merchants. This will, in effect, constitute a commission to cover inspection, classification, and office work.

All members of the scrap federation have been asked by the British Iron and Steel Federation to sign an undertaking not to export scrap iron and steel. They have also been asked to furnish details of all export transactions arranged on or before Feb. 27, including a statement of undelivered balances. These data are essential to allow the British Iron and Steel Federation to supervise the operation of the domestic scrap plan.

Scrap Trade Was Divided

While the British control plan is now operating successfully, scrap dealers were for some time sharply divided about the merits of control. One merchant group wished to stand on the ordinary fluctuations of the market, pointing out that scrap prices are lower than in 1929, when steel prices were lower and

demand smaller. It was contended that scrap is undervalued compared with pig iron on a basis of melting equivalents, and that, with the same percentage of the charged weight, scrap makes up a smaller proportion of the total cost of production of steel than in previous years.

This view was overruled by a more influential group, which contended that scrap market fluctuations must be ironed out as part of the system of fixed prices for finished material. The high prices paid for foreign scrap, it was argued, are determined by conditions in the international market, which cannot be controlled like the domestic market. Inasmuch as the chief factor of interest to merchants is the margin between their buying and selling prices, it was claimed that the present very high prices paid for American scrap are of little consequence.

An interesting feature of the present steel shortage is the small percentage that is being used in Britain's rearmament program. Sir Thomas Inskip, Minister for the Coordination of Defense, stated recently that it was less than 10 per cent of the total consumption of industry. The percentage of American scrap so employed will be even smaller, as the imports consist of mixed iron and steel scrap and the demand of the armament firms is almost wholly for steel scrap. It is generally believed that, of the 300,000 tons of American scrap allotted to Britain by the cartel this year, less than one-tenth will be consumed by the armament-producing industries.

Trailer Laboratory To Aid Enamelers

A LABORATORY trailer equipped by the B. F. Drakenfeld Co., Inc., 45 Park Place, New York, to perform all the functions involved in porcelain enameling and fitted up particularly to render service to enamelers in speeding up the matching of colors for all types of enamel ware, started June 1 on a tour which it is stated will take it to every porcelain enamel plant east of the Mississippi River.

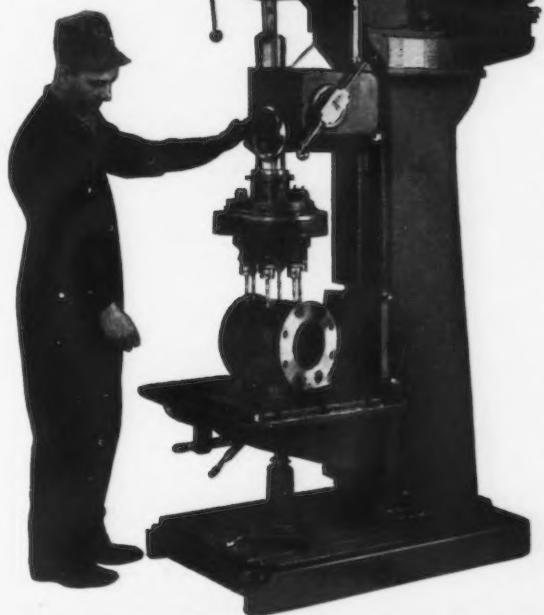
When the trailer reaches the parking lot of an enameling plant it is all set to handle almost any color problem. It is provided with a spray booth, furnace, grinding mills, base oxides, etc., and is equipped to perform the entire process of porcelain enameling from weighing out ingredients to the final firing.

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DRILLING MACHINES

for
EVERY
PURPOSE

Sliding Head
Drilling Machine
Equipped With
Multiple Head



The heavy duty drill shown at left is one of a complete line of drilling machines . . . it's fully geared . . . automatically oiled . . . has full anti-friction bearings . . . is furnished with plain or heavy duty compound table . . . has reverse for tapping direct through motor . . . and is furnished in a wide range of sizes.

Cleereman Drilling Machines include all types of light, accurate drills. Tell us your drill requirements—we will be glad to send bulletins giving data.

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HEAVY DUTY GRINDERS AND BUFFERS

HERE is an illustration of the MARSCHKE "CONSTANT CUTTING SPEED" PRODUCTION GRINDER made for 24" wheels and powered with 15 to 25 H.P. D.C. motors.

The combination of the massive construction supporting the spindle in four equally spaced, accurately aligned ball bearings and automatic constant cutting speed control—during the entire life of the wheel—accounts for maximum efficiency of operation with this Marschke Grinder.

The Marschke line also includes smaller sizes of Heavy Duty Grinders of every type for A.C. as well as D.C. operation, and a variety of Buffers. There is a Marschke for your particular requirements.

A catalog showing the full line of Marschke Grinders and Buffers will be sent promptly upon receipt of your request



VONNEGUT MOULDER CORP.
1807 Madison Avenue, Indianapolis, Ind.

Steel Industry Added 12,000 Men in April

MORE than 12,000 employees were added to the payrolls of the steel industry during April, the American Iron and Steel Institute has announced. Total number of employees in the industry is now at the record of 589,000, compared with 577,000 in March, 480,000 in April, 1936, and with an average of 458,000 in 1929.

Total payrolls in April, the first full month following the general wage increase effective March 16, amounted to \$94,322,000, as against \$90,863,000 in March, \$60,151,000 in April of last year and average monthly payrolls in 1929 of \$70,105,000.

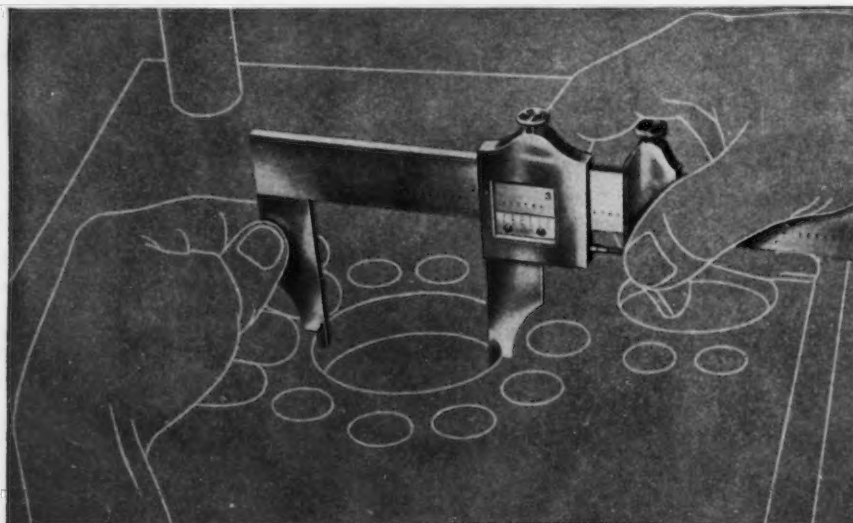
	April, 1937	March, 1937	April, 1936
Number of Employees	589,000	577,000	480,000
Total Payrolls	\$94,322,000	\$90,863,000	\$60,151,000
Average Hourly Earnings, Wage Earners	85.6c.	79.3c.	65.5c.

Average hourly earnings of the 530,000 wage-earning employees of the industry who are paid on an hourly, piecework or tonnage basis were 85.6c. per hr. in April, the highest ever reached in the industry. In March the average was 79.3c. per hr., while the April, 1936, average was 65.5c. In 1929, steel wage earners received an average of 65.4c. per hr.

Wage earners worked an average of 41.3 hr. per week in April, bringing average weekly earnings

during the month to \$35.35, substantially at the 1929 average of \$35.90 per week, when employees worked 55 hr. per week. The average number of hours worked weekly was 42.5 in March, 40.9 in April, 1936, and 55 in 1929.

The following table compares total number of employees and total payrolls of the steel industry, and average hourly earnings of wage earners, for the months of March and April, 1937, and April, 1936.



Exactly 2.400"

There are no "ifs, ands or buts" about a reading from the vernier on a Starrett Shop Equipment Tool. The clean, sharp graduations say what they mean clearly and distinctly. And that goes for Starrett Micrometers and Dial Indicators, too.

An investment in Starrett Shop Equipment Tools is an investment in greater accuracy. That's why it pays to standardize on Starrett. You'll find anything you need among the more than 3000 fine precision tools and dial indicators shown in the revised edition of Starrett Catalog No. 25AA. Write for your copy.

The L. S. Starrett Co., Athol, Mass., U. S. A.

World's Greatest Toolmakers—Manufacturers of Hackaws Unexcelled—Steel Tapes, Standard for Accuracy

Standardize on
STARRETT TOOLS
BUY THROUGH YOUR DISTRIBUTOR

Air Conditioning Making Large Gains

INSTALLED cost of equipment sold by the members of the Air Conditioning Manufacturers' Association broke all records in the first four months of 1937, aggregating \$41,311,301, an increase of 180 per cent over the sales of \$14,756,992 in the same months a year ago, and a total not reached in 1936 until October, according to an announcement by William B. Henderson, executive vice-president.

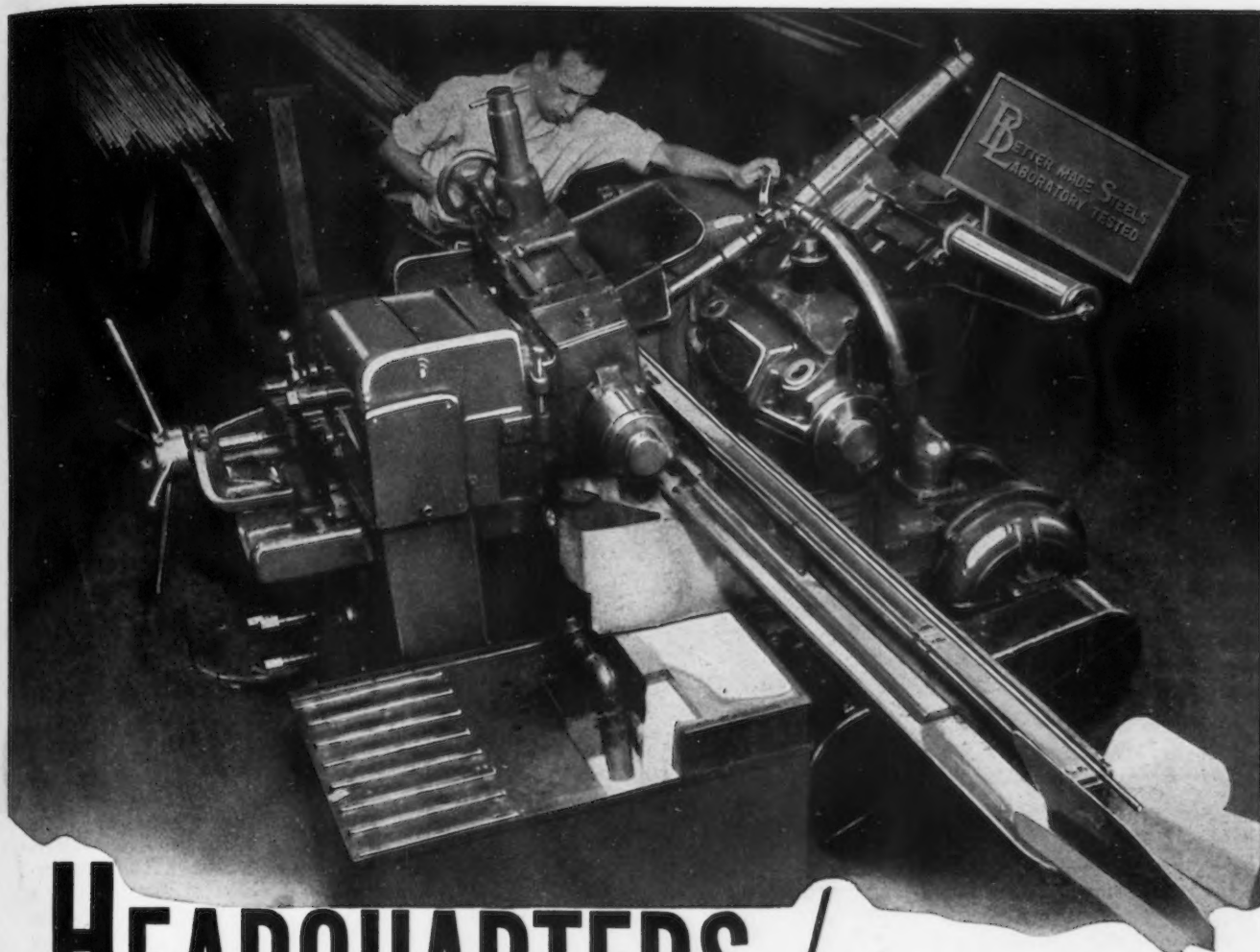
April sales at \$9,663,009, were second highest of any month in history, an increase of 156.8 per cent over the April, 1936, total, which was \$3,751,015.

The association's sales in 1936, biggest year of the industry's history, were \$49,942,301, and the sales reported this year already are 82.7 per cent of that total.

Metal Show Space 91 Per Cent Sold

INTEREST in the 19th annual National Metal Show to be held October 18-22, in Atlantic City, N. J., is indicated by the fact that 91 per cent of the available exhibiting space has already been sold, although the opening date of the show is over four months away.

The National Metal Congress, which will be held in conjunction with the Metal Show, will convene on the second floor of the Atlantic City Auditorium, while the Metal Show exhibits will occupy the entire first floor.



HEADQUARTERS *for* Quality GROUND SHAFTING

Making one kind of steel for nearly half a century . . . holding to a single standard of quality in producing thousands of tons of Cold Finished Bars . . . this record has won recognition for B & L mills as a dependable source of Ground Shafting.

Carefully watched and scientifically checked at every step of its production . . . hidden bar blemishes revealed and eliminated through magnetic analysis . . . straightness, concentricity, size and section, are verified by the latest type of testing devices.

B & L Shafting is supplied to specified accuracy and finish to meet your requirements: Drawn, Ground and Polished . . . Turned, Ground and Polished. B & L Small Rounds are produced in mirror-finish and to special accuracy for exposed parts and close-fitting assemblies.

Write for Shafting Folder

- Cold Drawn Bars
-
- Ground Shafting
-
- Ultra-Cut Screw Steel
-
- Special Sections
-
- Extra Wide Flats
-
- Alloy Steels

BLISS & LAUGHLIN, INC.

HARVEY, ILL.

Sales Offices in all Principal Cities

BUFFALO, N.Y.

Addresses Steel Distributors on Possibilities in Sales Training

THE basic importance of sales training in today's distribution picture was emphasized, and some of the requirements of an adequate training program were outlined by H. F. Ramage, sales promotion manager, Republic Steel Corp., in an address at the 26th annual meeting of the National Association of Sheet Metal Distribu-

tors, held at the Hotel Cleveland, Cleveland. The address in part follows:

Successful sales management and sales training go hand in hand—without the one the other cannot develop.

We all know that there are various types of salesmen. We have

good, bad, and indifferent salesmen. Too many today are average. They do not stand out, they are not possessed with any particular individuality and perhaps that is one of the basic reasons why we are giving so much thought to sales training today.

In business, many activities command attention. One can be the chief cook and bottle washer and as such be forced to be the sales manager one minute, the president the next and then a few minutes later be a man to register a sympathetic understanding of the truck driver's problems.

In all these activities, one pays more attention to those items that are of major importance and particularly those that require seasoned judgment and foresightedness. The proper and successful management of a sales organization and the preparation for its future, we believe is one of the most important present-day activities.

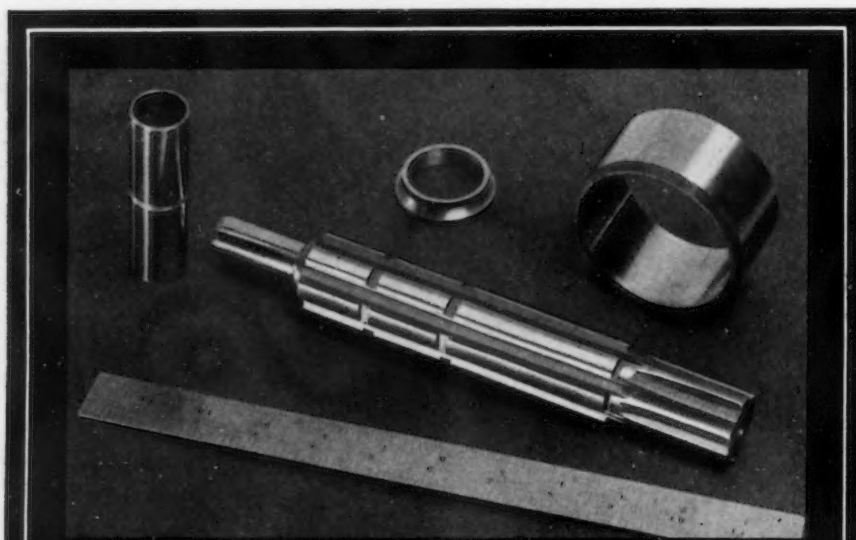
Business Scene Changing

Today we are all faced with a rapidly changing panorama of the business scene. Problems are probably more vexing than at any other time in the history of our business experience. Through it all, the distributor is constantly gaining a stronger place in the distribution of steel products. It places a new challenge on the distributor. Does it not mean that the distributor must prepare his organization to do the job by availing himself of all facilities at his command?

A distributor can live for quite some time on his reputation; he can almost hibernate like the bear does in the winter time. A built-up acceptance and demand for a product may carry a distributor a long distance. It is by this method that many distributors depend upon a large volume of their sales. Too few are the distributors who are laying a foundation for their companies and the products that they distribute.

Markets for products are rapidly changing; new products are being constantly introduced. A product for which there is a good demand today may pass out of the picture tomorrow. We are all faced with the proposition of laying a better foundation for future sales and that requires salesmen who are better trained, men who will be in a position to take advantage of every possible opportunity.

Quite naturally a distributor has a right to expect his source of supply to lay the groundwork in the development of a given product, but all of the promotional effort of the manufacturer is to no avail unless



Where more than .0005" is too much

In producing precision parts for certain automobile manufacturers dimensional tolerances of as little as .0005" are not unusual, while other specifications such as hardness have to be held within minute limits. Such exacting requirements, however, offer no problems to Houde, for here is an organization schooled in the intricacies of mass production to precision standards—and armed with a great deal of special machinery and equipment designed for such assignments.

It is quite possible that in your production there are parts or assemblies which Houde can make for you with greater speed, greater precision and more economy than your own facilities permit. We are doing just that for hundreds of manufacturers. Inquiries concerning this service are invited.

HOUDE

ENGINEERING CORPORATION, BUFFALO, N. Y.

A DIVISION OF HOUDAILLE-HERSHEY CORPORATION

SPECIALISTS IN MASS PRODUCTION TO PRECISION STANDARDS

the distributor takes advantage of this work. Wouldn't the distributor find it profitable if he were to take a more aggressive and creative merchandising stand? If he doesn't become more active, the manufacturer will be forced to find some other channel of distribution.

Sales Training Should Look to Future

Sales training is something that is widely talked about but few companies have stepped out deliberately and accomplished a real job of sales training. In launching a sales training program, executives must exercise far-sighted judgment. Sales training does cost money and the immediate results may not be legible on your balance sheet for some time.

Sales training is not for today, it is for tomorrow. It will be the ganization. Think several years backbone of any future selling or-ahead on this program. Sales training must precede any sound program of selling. This year there has been a mad rush by many organizations to build up their sales forces. Scouting crews have been pounding at university doors since the turn of the year. It is not unusual for a promising young graduate to have several worthwhile offers from large industrial concerns.

I would like to refer to the experience of conducting the sales training program at Republic which has been underway since 1930. It continued under full steam even during the low spot of the depression.

In our opinion, the three most important phases of any sales training program are, namely: selection, training and allocation.

Proper Selection of Applicants Vital

Proper selection of applicants—that is, the fundamental and vital first step for a successful sales training program. It becomes necessary to establish a minimum standard for admittance to a given sales training activity. The ultimate success of a salesman, from the very inception, should be of paramount consideration in sales training. Without tools, a sales manager cannot hope to accomplish the objectives of a well-rounded sales campaign. Hence the raw material that is to be trained must meet a set standard. Nothing but the best talent is good enough to meet the exacting demands of future selling organizations.

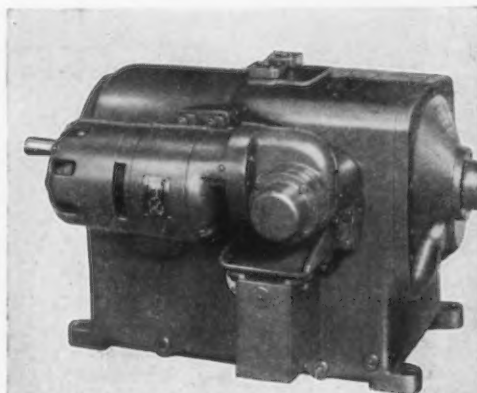
It is extremely difficult to set forth a list of minimum standards for selection that would be ap-

plicable to all types of business. Referring to the problems confronting steel sales executives today, it follows that first of all a steel salesman must represent the best in sales personality. He should have a personality with an immediate appeal, a keen intelligence, a goodly portion of common sense; and convincing speech with clarity of tone and an easy flowing vocabulary. A salesman should be courteous. His politeness and manner should be of the highest possible standard. Lastly, he should possess an appealing

appearance of person and dress. Impossible and improbable, one might say—well, not exactly, but it must be admitted that this type doesn't grow on trees. One must search for such talent. Management realizes that almost endless interviews are necessary before final selections are accomplished.

Educational Requirements

Educational requirements will vary in accordance with the objectives of the job. Some companies



**"Nothing Else
Would Do
the Job"**

- ★ Smooth Acceleration and Deceleration
- ★ Accurate Stepless Speed Control . . . Minimum to Maximum in either direction
- ★ Automatic Load Indication and Overload Protection
- ★ Flexible Location with Hand, Automatic or Remote Control
- ★ High Efficiency, Low Maintenance
- ★ Smaller Size, Lower Cost



FROM industry after industry I comes glowing praise of the New Oilgear *Fluid Power* Variable Speed Transmission. New simplicity, new adaptability, new compact design, new low prices, all combine to make Oilgear the most widely discussed development in the transmission field. Be sure you have full information. Write for Oilgear Bulletin 60000 today. THE OILGEAR COMPANY, 1311 W. Bruce St., Milwaukee, Wis.

OILGEAR *Fluid Power*
VARIABLE SPEED TRANSMISSIONS

insist on selecting college graduates. Others do not adhere to this rule, but endeavor to balance the applicant's education and personality. It would seem that a metallurgical graduate, or one who has had at least a science major, would represent the best possible prospect for a steel corporation. Strangely enough, experience points to a number of outstanding steel salesmen who majored in other subjects. So, much depends upon the individual.

With steel selling taking on a new era of development, it is safe to say that the future steel salesman will need all the possible scientific and technical training that he can command.

Republic practises a rigid selection procedure. The final selections are made by a committee of five sales executives with the supervisor of sales training acting as an ex-officio member. The final selection is not one man's opinion, but a com-

posite judgment that is more certain to be sound and consistent.

Much could be said about the detailed investigation that is conducted on promising applicants. Careful check into character references and health examinations are two of the important considerations. It is to be expected that each one has unfailing honesty and loyalty.

Students Given Mill Course

Sales training is really a misnomer as applied to industrial schools. The art of selling is acquired most effectively by actual experience. There are numerous training activities that can be instituted which will aid the student in gaining a perspective of selling. The basic endeavor is to teach the student every phase of the manufacture of the products he will later sell. Republic has a mill schedule that routes the student into every department of each mill. The mills are located in eight different cities, with Cleveland as the hub of activities. The mill course is strictly observational in character. This procedure enables each student to spend all of his time in study and observation. A carefully prepared routine for each department serves as a guide or manual. Of most value and importance is the personal supervision that is exercised by the supervisor of sales training.

Durable goods companies for the most part have a number of various products to sell. Assuming that the type of training selected would depend upon individual factors, it may be found that a year and a half will constitute an absolute minimum training period. Companies involved in selling consumer goods are not confronted with the need for an inside story on the manufacture of its products. Their salesmen will not be called upon to assist a fabricator or manufacturer. Merchandising and distribution plans are their daily tasks. Thus a factory training period can be materially shortened and time allotted to learning the routine of business transactions.

To better prepare the student for field activity, Republic Steel allots a portion of the office training time to be spent in its own purchasing department. Further, upon the completion of the training course, there follows a careful review of all comments on conduct and an examination of written reports on each mill. A digest is prepared and submitted to the sales executives. After a study of existing vacancies and available talent, an

Cut Drilling and Tapping Costs
with GRAND RAPIDS GRINDERS



Taps and drills cut faster when they are kept sharp—they last longer when they are correctly ground. Grand Rapids Grinders do the grinding in half the usual time and with a precision that eliminates tool breakage. They can save you money. We make many types and sizes in addition to the No. 10-B Combination Tap and Drill Grinder shown here.

Write for bulletin.

W. L. MEYER & LIVINGSTON CO.
Grand Rapids, Michigan



ACID RESISTANT CHAIN SLINGS of AMPCO METAL

are steadily gaining in popularity because of

1. High tensile strength.
2. Great resistance to corrosion.
3. 20% less weight than ordinary bronze chains.

Ampco chain is integral-cast for metal uniformity and for the elimination of oxide focal points for rapid corrosive attack.

AMPCO METAL, Inc.

MILWAUKEE, WISCONSIN

assignment of a graduate to a district sales office can then be completed.

So much for the subject of sales training. Now let us discuss the welfare of the man on the firing line. What are companies doing to keep them up-to-date?

Progressive companies conduct organized sales meetings for their salesmen. With Republic, specialists from the mills are regularly scheduled to give lectures on specific products or subject to the district office personnel.

It is the policy of some organizations to have large sales conventions for their entire sales force. Although this scheme may be considered to be a favorable gesture toward the salesman, few have followed this plan because of the tremendous expense involved.

Sales promotional material is constantly being prepared with the thought in mind of keeping the district salesmen fully informed on new applications and products.

A corps of trained metallurgists are always available on instant call. They work hand in hand with the salesman developing or solving processing and fabricating problems in customers' plants.

Many distributor salesmen are doing a very fine job in selling stainless steel. They take full advantage of mill assistance. They study the product; they ask questions of the mill man; they are on the lookout for new applications. They talk up the merits of stainless steel for fabricators; they are always on the alert for new stainless customers. The distributor salesman is in an excellent position to obtain such information. He should be a leader in getting new business.

Distributors are required to do a more intelligent job of selling. With a properly trained sales force, they are able to increase sales. They will be able to make more profit because they will not be trading dollars. They will know the value of certain products, their sales advantages, and which mean profit.

FORREST U. WEBSTER, associated with Cutler-Hammer, Inc., Milwaukee, for 12 years, has resigned to join the staff of Lord & Thomas, New York, advertising agency. He was for nine years advertising manager of the Milwaukee electric control firm, and for the last three years merchandise sales manager. Mr. Webster is a former president of the National Industrial Advertising Association and of the Milwaukee Association of Industrial advertisers.

CIO Loses Election At Yale & Towne

THE Committee for Industrial Organization was defeated in a referendum under the Wagner Labor Act to select a collective bargaining agency for the 3500 employees of the Yale & Towne Mfg. Co. at Stamford, Conn.

A count of the votes showed that

Yale & Towne Employees Association was chosen by a plurality of 146 ballots. The organization is not affiliated with any national labor union.

MYRON C. TAYLOR, chairman of the board, United States Steel Corp., New York, returned on the Bremen from his trip to Europe on June 8.

SPEED, WEIGHT and STAMINA

Mark these new MARVEL Heavy Duty High Speed Sawing machines. All ball-bearing construction, coupled with advance design principles, enable them to far out-cut, out-last, and out-run any other saws built.

With or without automatic bar push-up, they are today's fastest and most efficient cutting off machines for bar stock up to 10" x 10". Strictly multi-purpose tools, they will serve as general purpose hack saws and/or automatic production machines.

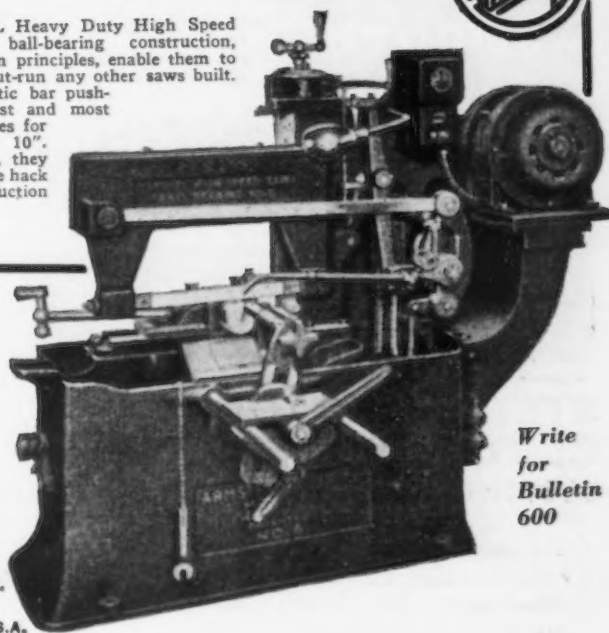
MARVEL No. 6
capacity 6" x 6".

MARVEL No. 9
capacity 10" x 10".

MARVEL No. 6A
with Automatic Bar Push-Up
capacity 6" x 6".

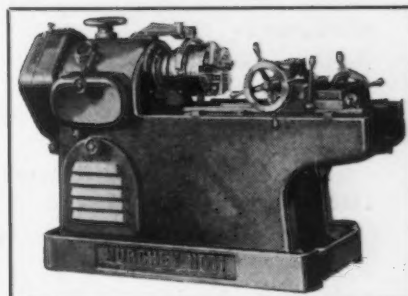
MARVEL No. 9A
with Automatic Bar Push-Up
capacity 10" x 10".

Armstrong-Blum Mfg. Co.
"The Hack Saw People"
5849 Bloomingdale Ave., Chicago, U.S.A.



Write
for
Bulletin
600

NEED Faster Threaders?



With production pointing upward in all lines you will want to get greater output from each machine. On threading operations you can attain this greater efficiency with Murchey machines.

Two sizes of machines, No. 11 and No. 22, cover the range of machine threads from 1/4" to 2 1/2" and pipe threads 1/8" to 2". Machines are equipped to use tangential chasers.

MURCHEY MACHINE & TOOL CO.

951 PORTER STREET

DETROIT, MICHIGAN

Collapsible Taps, Self Opening Die Heads; Bolt Threading, Pipe Threading and Pipe Cutting Off Machinery.

Youngstown Sheet & Tube Co. Charges Violence and Sabotage by Strikers Though It Is Not Trying to Operate

Following advertisement appeared in Youngstown Daily Vindicator June 7:

"THE Youngstown Sheet & Tube Co. recently stated its position about resumption of work at its plants to the mayors of

Youngstown, Campbell and Struthers and the sheriff of Mahoning County.

"These officers were told that the company would not attempt to resume work until its employees are desirous of returning to work.

**SMOOTH ACCELERATION . . .
POSITIVE SYNCHRONIZATION
. REMOTE CONTROL . UNIFORM
TORQUE . DEPENDABLE . SAFE .
. POSITIVE ACTION**

STEARNS MAGNETIC CLUTCHES & BRAKES CLUTCH-BRAKE COMBINATIONS



Adding weight to a magnetic clutch does not improve its efficiency. In Stearns High Duty magnetic clutches as high as 33 1/3 percent of the rotating dead weight has been eliminated.

At no expense of torque qualities

At no expense of capacity

At one-third lower watts consumption

Stearns magnetic clutches are the result of better engineering. We have pioneered more friction devices than any other manufacturer. Constant research and development have produced a magnetic clutch that for torque, lining area, dimen-

sions and watt consumption make it the outstanding power transmission unit.

Stearns Magnetic Clutches are available as standard units in sizes ranging from 2 inches in diameter to 46 inches and torque rating of 25 in. lbs. to 60,900 ft. lbs. A wide variety of clutches, brakes, clutch-brake combinations are designed.



Our engineering department will be glad to work with you on your clutch problem. Our many years of practical pioneering experience is at your service.

Write us for literature, data on applications and advantages. Ask for Bulletins 500 and 600.

STEARNS MAGNETIC MFG. CO.

Formerly Magnetic Mfg. Co.



635 S. 28th Street

Milwaukee, Wis.

"They also were informed that work would not start until they, the duly-constituted law enforcement officers, are prepared to afford full and proper protection to the company's employees and their families against physical attack and lawlessness.

"The company's policy has been and now is not to expose its employees to violence and injury.

"Despite this purpose to avoid and prevent any disorder, the press in the last two days has carried sinister threats by CIO leaders. An imported organizer of the CIO named Stevenson or Steuben, is quoted as saying: 'Pickets will no longer permit their lines to be broken, cost what it may. The next carload that goes into the rod and wire plant will do so over our dead bodies.'

"To what was this non-employee of any local steel plant, this non-resident of this district, referring? He was speaking about food supplies being taken into the plants for use by loyal taxpaying, law-abiding citizens of this community who are only maintaining the company's plants and machinery in condition for the day when many thousands of its employees will desire and be able to resume their regular occupations.

"One is reminded of the loud outcry made by this same CIO about taking food to hordes of sitdown strikers in other localities who in violation of all American concepts of law and order had seized possession of property which did not belong to them and who were doing incalculable harm to the rightful owners. Just when has it become so important to feed law-breakers, when holding seized property, which belongs to someone else; and on the other hand, why is it a cause for bloodshed and coercive threats of mob rule, when food is destined to law-abiding citizens of this community, carrying out their rightful employment in a legal manner?

"Threats of blood and thunder, riots and civil commotion, or subtle propaganda by paid non-resident experts, will not decide issues of right and wrong.

"Another CIO chieftain not a resident of our community, Mr. Murray, is quoted as having said: 'Sinister and bloody things are in the offing in Youngstown.' He previously had threatened that the CIO closing of plants would make all others pale into insignificance for blood-letting riots, etc. The people of our cities of Youngstown, Campbell, Struthers, Hubbard and Girard may draw their own conclusions as to whether the CIO deliberately

has planned and now contemplates a reign of terror for these cities which were peaceful and busy until these agitators of trouble came into their midst, fresh from their similar activities in other communities.

"Another CIO organizer, Mr. Mayo, is reported to have wired the following threat to the Governor of the sovereign State of Ohio: 'We respectfully wish to inform Your Excellency that the pickets no longer will permit their lines to be broken, cost what it may.'

"Our home-owning, taxpaying citizens will recognize certain communistic phrases in all of these unveiled threats of tragedy in our community of quiet and peace.

"The CIO suggests it will provide CIO men for maintenance and preservation of millions of dollars worth of machinery. This company will not entrust this all-important task to men whose hostility has been stirred up and whose desire to keep the machinery in order for our employees has been rendered doubtful by the emotional propaganda of a group of outsiders, not responsible to the owners of the property. Many other acts of deliberate law breaking have occurred and others have been incited. Certain persons, by the use of a blow torch, have rendered useless a private railroad connecting track owned by this company. Following this the same Stevenson is quoted as having said: 'There are a lot of other tracks and switches around these plants that need fixing.' This company will prosecute to the limit of the law any and all persons detected in causing any damage to or destruction of any of its plants or properties. It will consider any such occurrences as proper justification for the discharge of or refusal to hire any person guilty thereof. The company will consider as an unlawful act and proper justification for discharge or refusal to hire, any threats of bodily injury.

"The Youngstown Sheet & Tube Co. hereby offers a cash reward of \$2,500 to anyone who shall furnish evidence bringing about the arrest and conviction of any person involved in the cutting or removal of the rail from the connecting railroad track above mentioned.

(Signed) The Youngstown Sheet & Tube Co., by Frank Purnell, president."

General Motors Faces New Demands

General Motors officials awaited receipt of letter being drafted by UAW committee concerning negotiations on revision of UAW con-

tract. Demands amounting to \$50,000,000 annually in wage increases, sole collective bargaining in all G. M. factories, 35 hr. week and national minimum wages were to be included. Negotiation of all requests without NLRB election is anticipated by Union and also G. M. officials.

Late developments in automotive labor situation include a general strike started by UAW at Lansing. Arrest of pickets on warrants charging molesting and disturbing peaceful laborers precipitated march on capitol and shut down

Olds Motor Works, Fisher Body Corp., Reo Motor Car Co., Motor Wheel Corp. and others.

Harry Bennett, Ford personnel director, made his first appearance before a one-man grand jury investigating the Ford riot.

WALTER ERMAN has been elected president and treasurer of Erman-Howell & Co., Inc., Chicago, scrap brokers. J. C. GODHELP has been elected vice-president. E. G. HOWELL, formerly treasurer, has terminated his active business connections with the company.

Wyandotte Metal Cleaners - - and the Engineering Technic

A metal cleaning job is always "Special"—from the Wyandotte point of view. Every job is engineered. A suggestion leading to a desirable improvement, whether great or small, is based on *knowledge*—never on somebody's opinion.

Coupled with the co-operative efforts of your plant executives and the Wyandotte Service Representative, are the resources of the largest producer of industrial cleaners, including numerous warehouse stocks of highly specialized metal cleaners bearing the Wyandotte brands. That each Wyandotte cleaner does its job exceptionally well is proved by a legion of satisfied customers of many years standing.

May We Co-operate With You?



THE J. B. FORD COMPANY • WYANDOTTE, MICH.

Toledo Companies Are Merged

THE Wine Railway Appliance Co. and the Industrial Steel Casting Co., Toledo, have voted to consolidate under the name of the Unitcast Corp., and the merger will become effective July 1. The Wine company was organized 25 years ago to manufacture patented de-

vices and equipment for railroad cars developed by William E. Wine and the late Joseph L. Tillman, Sr. The Industrial Steel Casting Co. was started in 1920 by officers of the Wine company and has manufactured castings both for the latter company and for the trade. In addition to carbon steel castings, the Industrial company manufactures alloy steel castings marketed under the trade name of "Toledo alloys."

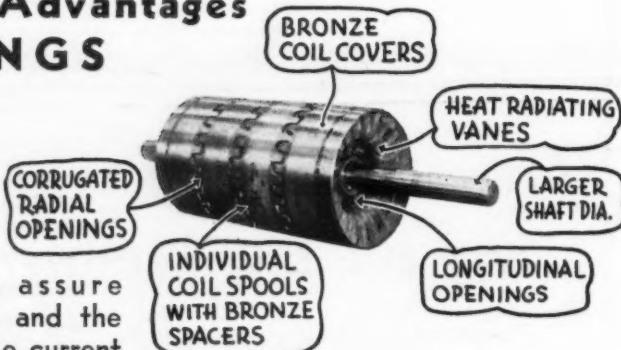
With the new set-up, the Unitcast Corp. will have a subsidiary known as the Industrial Steel Casting Co., to be a selling agent for the alloy steels, and another subsidiary to be known as the Wine Railway Appliance Co., to act as selling agent for the Wine appliances. The Unitcast Corp. will itself handle the sales of special cast steel car parts.

Officers of the Unitcast Corp. are William E. Wine, chairman of the board, Ralph F. Tillman, president and treasurer, Lambert J. Tillman, Joseph L. Tillman and Cyrus Hankins, vice-presidents, and H. W. Morgan, secretary. These officers with John B. Nordholt constitute the board of directors.

Exclusive Advantages Make DINGS a Better Separator

These features assure cooler operation and the passage of more current through the separator windings, resulting in greater magnetic pull for

Dings
High Intensity
**MAGNETIC
SEPARATION**



cleaner separation. These advantages make Dings Separators the most powerful separators on the market size for size.

For better separation specify Dings.

Dings Magnetic Separator Co.
727 Smith St., Milwaukee, Wis.

SEPARATION HEADQUARTERS SINCE 1899

NOTHING ON OUR MINDS BUT—



SPRINGS

DUNBAR BROS. CO.
DIVISION OF ASSOCIATED SPRING CORPORATION BRISTOL CONNECTICUT

....PIPE LINES....

O'Hern Pipe Line Co., Corpus Christi, Tex., affiliated with Corpus Christi Crude Oil Co., same place, plans new 4-in. welded steel pipe line from Government Wells oil field, Duval county, Tex., to O'Hern oil fields, Webb County, Tex., about 33 miles, for crude oil transmission. Connection will be made with main pipe line of company at last noted place. Cost over \$250,000 with booster stations and operating facilities.

Bureau of Supplies and Accounts, Navy Department, Washington, closes bids June 22 for steel pipe; also for steel tubing and wrought iron pipe (Schedule 913) for Eastern and Western Navy Yards.

Sloan & Zook Co., Main Street, Bradford, Pa., operating oil properties and refineries, plans steel pipe line gathering system in oil field at Bolivar, N. Y., with main pipe line for connection with company trunk line to Myrtle, Pa., for crude oil transmission. New bulk terminal will be located at latter point, including two 15,000-bbl. steel tanks and other equipment.

Humble Pipe Line Co., Humble Building, Houston, Tex., has let contract to Apex Construction Co., Second National Bank Building, Houston, for new 8-in. welded steel pipe line from oil field at Anahuac, Chambers County, Tex., to refinery of parent company at Baytown, Tex., for crude oil transmission.

Standard Oil Co. of California, 605 West Olympic Street, Los Angeles, is considering new welded steel pipe line to Wilmington oil field district, near Los Angeles, to handle output of about 20 independent oil operators in that territory, with total facilities for about 40,000 bbl. per day, including booster stations. Wilmington Field Committee, James Michelin, vice-president, is interested in project.

Southern Counties Gas Co., 810 South Flower Street, Los Angeles, plans extensions and replacements in welded steel pipe line system in Orange County, including about 16,000 ft. of 12 $\frac{3}{4}$ -in., for natural gas transmission to Santa Ana and vicinity, and about 13,000 ft. of other sizes in neighboring districts; also installation of regulators, meters and other service facilities. Cost about \$245,000. Company will also build new service and control buildings in same territory, to cost about \$26,000.

Wheatman Petroleum, Ltd., Calgary, Alta., plans pipe line system for natural gas distribution at De Bonita, Alta., with control station and operating facilities. Cost over \$75,000.

Safford, Ariz., will open bids in about two weeks on 21 miles of 10-in. pipe for a water system.

President Roosevelt Refers Appeal From Strikers to the Labor Board

WASHINGTON, June 8. — Present indications are that the Administration will continue to maintain a "hands-off" policy in the steel strike situation. Despite interruption to United States mail and damage to railroad property by strikers, which ordinarily would bring quick Federal action, Washington prefers, though not entirely successfully, merely to act in the role of an observer through the Department of Labor and to let State and municipal authorities bear the burden of wrestling with the grave difficulties that are brought before them.

Efforts of the Steel Workers Organizing Committee to bring about intervention by President Roosevelt failed yesterday. A telegram received at the White House from 80 locals of the SWOC in the Calumet region was sent to the National Labor Relations Board. The telegram asked the President to bring the strike at the South Chicago plant of the Republic Steel Corp. to a peaceful end. An aide at the White House, who said the telegram was sent to the NLRB for any action it sees fit, said it went to the board as a matter of "routine."

The White House rid itself of the SWOC message by a statement by the aide that it is a matter to be handled by the NLRB, not the President. "With the Wagner Act upheld," said the aide, "why have the NLRB, if it isn't to function?"

Meanwhile, at the Department of Justice it was denied that any protest had been made to it against damage to railroad property at Republic plants in Ohio. An unnamed high Department of Justice official had been quoted as saying it is possible the Department will intervene in the steel strike areas where railroad property has been damaged. He was further quoted as saying that reports of destruction of right of way of an interstate commerce carrier, if substantiated, might give the department jurisdiction to intervene and that violators of statutes interfering with the mails might be cited.

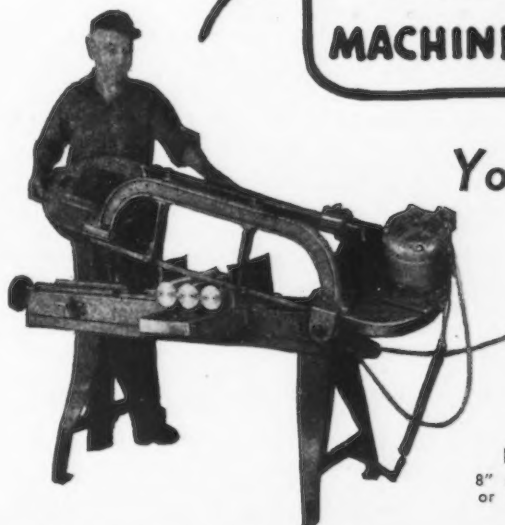
Obstruction of the right of way and damage to railroad property was brought to the attention of Governor Davey of Ohio by C. W. Galloway, vice-president of the Baltimore & Ohio, who said SWOC interference with rail operations had created a "state of riot."

Chairman Carroll Miller of the Interstate Commerce Commission, expressing a widely shared view, after pointing out that the ICC planned no protest against interference with railroad properties, explained that there is no way to protest.

The Post Office Department has confined itself to the statement that it will not deliver what it terms "irregular" mail to strike-bound plants, together with a denial that steel strikers have been permitted to inspect mail addressed to picketed steel plants.

Senator H. Styles Bridges, Republican of New Hampshire, has introduced a resolution demanding an investigation of interference in the delivery of mail at strike-bound plants.

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Steel Strikes Enter Third Week and Appear to be No Nearer Settlement

CLEVELAND, June 8. — The strike against Republic Steel Corp., Youngstown Sheet & Tube Co. and Inland Steel Co. entered its third week today, and appeared to be no closer to a settlement than when the Steel Workers Organizing Committee, a body controlled by the Lewis Committee for Industrial Organization, called the initial walkouts at the plants of these companies on May 26. Fail-

ure to reach a settlement has resulted from the steadfast refusal of steel company officials to sign the contract demanded of them by the SWOC.

In connection with the many phases of the labor controversy, several developments came to light during the past week. Apparent inability of the SWOC to make headway with the strike gave rise to a plea for Presidential intervention.

A group of 200 representatives of 80 unions attached to the SWOC in the Chicago area drafted a telegram to President Roosevelt requesting him to "act at once to bring the strike to a peaceful end." The request was turned over by the President to the National Labor Relations Board.

Charges brought by the steel union against Republic Steel Corp. for unlicensed use of an airfield in Cleveland from which it has been flying food to strike-bound plants at Warren and Niles, Ohio, necessitated appearance in police court today of a company official. It was explained that the corporation obtained such a license as soon as it became aware one was required. Trial was postponed a day.

The suit brought against Republic by Robert W. Northrup, stockholder, claiming misuse of funds expended for guns and ammunition with which to combat the strike, took a new turn over the week-end as attorneys for the corporation filed a counter suit. The corporation asked that the action be dismissed, and asserted the plaintiff was guilty of fraud since he had acquired his sole stock ownership (10 shares of common) on May 25 solely for the purpose of aiding and abetting the SWOC and affiliated labor groups in interfering with the business and operations of the company. The company's counter charges identified the plaintiff with CIO interests.

Other developments during the week included charges brought by Republic that strikers had interfered with delivery of the mails at some of its plants and that postal

High Spots of the Steel Strike Situation

President Roosevelt received a telegram from SWOC unions in the Calumet district, Chicago, asking him to "act at once to bring the strike to a peaceful end by having a joint wage agreement written and signed by the steel corporations and the SWOC," entirely overlooking the fact that the Federal Government under the Wagner Labor Act has no authority to compel any signed agreement. The President referred the telegram to the National Labor Relations Board, which declines to interfere at present, saying that no formal action has been instituted that would give it jurisdiction.

Mayor Kelly of Chicago ordered Republic Steel Corp. to evacuate its loyal workers from its South Chicago plant on the ground that the use of the mills for living quarters was in violation of city ordinances. The Republic company moved pullman coaches into the plant to provide for 1000 men who continue at work. The Chicago mayor acted upon complaint of the CIO, which saw no similar law violation when sitdown strikers were living in automobile plants under conditions of their own making that were infinitely worse.

Employees of the Republic mill at Monroe, Mich., took a vote under the supervision of Mayor Daniel Knaggs and an overwhelming majority was in favor of returning to work. The voters comprised 70 per cent of the total number of employees of the Monroe mill, and of these 95 per cent wanted to return to work, and 88 per cent definitely disapproved of the strike. A vote was also conducted at Canton, Ohio, by the Chamber of Commerce, which mailed 6465 ballots to employees. Some ballots were thrown out as fraudulent, and of those accepted as bona fide 3683 were in favor of returning to work and 216 against. A delegation of Cleveland workers asked the Republic company to clear the picket lines so they could return to work. The mayor of Monroe, Mich., promised police protection for the reopening of the mill on Tuesday.

Railroads serving the strike area telegraphed Governor Davey of Ohio demanding that he take immediate action so that they may perform their functions as common carriers. They charged that their property is being damaged and destroyed by removal of rails and that a "state of riot" exists.

Youngstown Sheet & Tube Co. issued a statement declaring there would be no work for its men until the law enforcement officers were prepared to afford full protection to its men and their families.



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authorities, in Warren particularly, were making no attempt to deliver the company's mail.

Railroads Bring Suit

An injunction suit brought by the Erie, Pennsylvania and B. & O. railroads against the CIO - controlled steel unions to restrain interference with operations resulted from strikers' actions at Youngstown and other points in blocking passage to and from various steel company yards. Counter charges were filed in Federal Court by the CIO.

Effects of the strike at the Warren and Niles, Ohio, plants of Republic Steel Corp. appeared to be gaining over the week-end, as pickets were successfully stopping shipment from these plants and steel was being piled up in cars inside the company's yards. Indications were that unless shipment could be made the company might cease to operate.

Elsewhere along the labor front, conditions remained little altered. Both Youngstown Sheet & Tube Co. and Inland Steel Co. continued inactive, while Republic Steel continued operating at about half the rate of operations prior to partial shut downs. Resumption of operations at Republic's mill at Monroe, Mich., was scheduled for today, following a vote conducted by the Mayor which resulted overwhelmingly in favor of a return to work.

Mediation efforts attempted by Governor Davey of Ohio in respect to plants on strike within his State had little or no effect.

\$160,000,000 Asked For Merchant Marine

WASHINGTON, June 8.—President Roosevelt today sent to the Speaker of the House a supplemental estimated appropriation of \$10,000,000 for the Maritime Commission and a request for authorization for \$150,000,000 for a Merchant Marine construction fund. The \$10,000,000 will be used to start the program. Mr. Roosevelt said that the United States has not been building merchant ships and is in a bad way in this field. He pointed out that, except for oil tankers, not a single seagoing cargo ship for foreign service has been built in the United States in 15 years. It is the hope through the \$160,000,000 to develop a modern and adequate American Merchant Marine.

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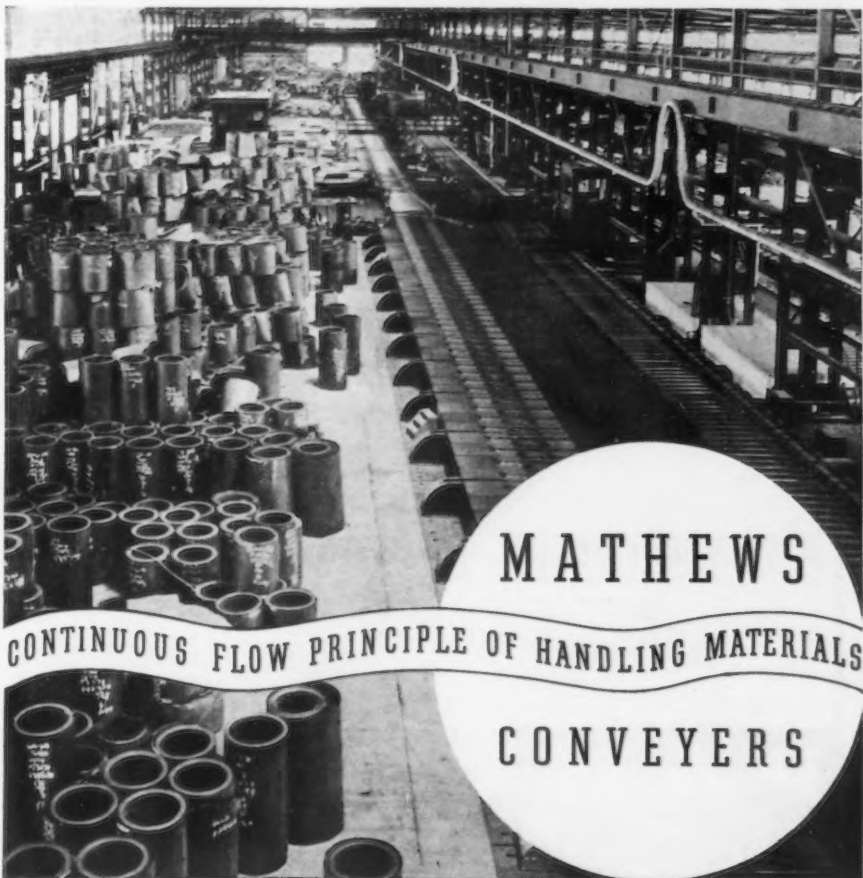
Mathews Conveyers include Belt, Live Roller, Drag Chain, Roller Chain, Pallet, Continuous Apron, Wheel, Roller, Vertical and Inclined Elevating Conveyers, special devices for up-ending, up-setting, tilting and transferring, for the handling of Hot and Cold Billets, Bars, Shapes, Sheets, Packs, Coiled Steel, Pipe, Tubing in continuous flow processes.

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CONVEYERS

Republic's Chicago Plant at 70%; Pullman Cars Provided for Workers As Mayor Orders Their Evacuation

CHICAGO, June 8.—Ordered by Mayor Kelly of Chicago to evacuate loyal workers who have been living inside the plant at South Chicago since a strike was called two weeks ago Wednesday, the Republic Steel Corp. yesterday

moved Pullman cars inside the plant grounds for the more than 1000 employees who are maintaining operations at over 70 per cent of capacity.

Charging that the city's health regulations forbade the use of the

plant for living quarters, the Mayor is continuing to watch carefully the arrangements made for housing the workers. Their former abode was the new wire mill, opened only a few weeks ago, which may now begin operating along with the blooming, merchant and rod mills.

Company officials state that the number of men inside the plant is increasing steadily as more and more workers decide to return to work.

Meanwhile Joseph Weber and George Patterson, CIO organizers of the march upon Republic Steel Corp. plant Memorial Day, are being held in \$1,000 bail, charged with conspiracy to commit an illegal act.

Shipments to and from the Republic plant are said to be moving freely. No disturbances of any kind have been reported from the strike fronts here, peaceful picketing being under way at Inland and Youngstown's plants. Although maintenance crews are on duty at each of these mills, no attempts are to be made to operate.

Considerable success is reported by independent unions, which are urging their members to go back to work.

Consumer response and co-operation is reported to be 100 per cent by all mills concerned, and, although some cancellations have been necessary, they have been accompanied often by apologies as well.

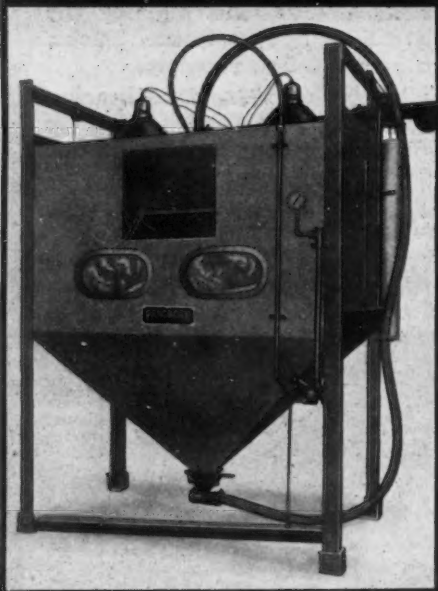
As far as could be ascertained today, no meetings of mill heads with union representatives are on schedule.

Time Lost by Strikes Heavy in 1936

IN Illinois last year 98 strikes caused the loss of 409,748 days work, according to the Illinois Manufacturers' Association. The total number of men involved was 24,094 and the average per strike was 246. Of the total idleness resulting from strikes in the United States, Illinois contributed 2.9 per cent. In Chicago alone, 39 strikes involved 3221 workers and caused 66,418 man-days idleness.

Approximately 60 per cent of the total number of workers taking part in strikes during the year was in New York, where 160,734 persons walked out. In Ohio, 124,803 persons were involved, in Pennsylvania 118,204, and in California 70,027. The greatest number of man-days idleness in strikes during 1936 was experienced in California because of the protracted maritime strike on the Pacific Coast.

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Republic Steel Plant at Buffalo Not Affected by Strike

BUFFALO, June 8.—Operations at the Buffalo plant of the Republic Steel Corp. continue unhindered by the strike of a small section of its employees. A reporter for the Buffalo *Courier-Express*, who recently made a trip of inspection, found all departments functioning at normal.

While the picket line is still maintained before the plant entrance, this has grown somewhat

smaller, and conditions are so normal that public interest is considerably lessened, and only a small number of persons watch the activities of the pickets.

While the company has made arrangements for the housing of its men within the plant, many do

not take advantage of this protection, but continue to pass to and from their homes through the picket line, generally via private automobile.

A mass meeting of strikers on Saturday night demanded that health conditions be investigated among the workers in the plant.

"The Republic Steel strike will not be won in Buffalo," said Hugh Thompson, UAW organizer, Saturday night. "It will be won elsewhere in the country."

Who Is the Murderer?

From an address delivered by Representative Clare E. Hoffman of Michigan before the Congress of American Enterprise in New York:

"On Sunday last (May 30), a day set apart for the worship of the One who gave us life, hope of the future, the CIO brought death to Chicago.

"Like all men who have visions of grandeur, Lewis does not hesitate to send men to their death.

"He knew that, in the Illinois plant of the Republic Steel Corp., 1400 workers who did not desire to follow his leadership were working. He knew that those workers and that plant were protected.

"Knowing this, yet determined to win at any cost, following the procedure he had sanctioned elsewhere, a mob of more than 1000 armed with clubs, knives, stones and bricks, was formed; and cowardly placing its women in the vanguard, marched down upon and brutally attacked the police, the guardians of law and order.

"Riot, battle and bloodshed followed. In a few short moments, the battle over, four of those who had been deluded and misled by Lewis's words and actions, lay dead on the field. Another has since died.

"These men died because John L. Lewis sent them to their death. Their blood is upon his hands. He cannot escape responsibility.

"He has adopted the methods of the Red communists."



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PARISH *Specialists in Stampings
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Machine Tools Builders Contribute To Prosperity

(CONTINUED FROM PAGE 31)

skilled men, who are now as scarce as they have always been, we can employ to build these machines and these gages.

Because of the higher quality of machine tools, there has been a substantial saving in the amount of scrap produced in industrial

plants. This is by no means a negligible item; it would be hard to appraise it accurately but all of us know that it was sheer waste, that it did no one any good and that its elimination is a decided forward step.

Hopes for Future vs. Experience of Past

Industrial progress can be halted by uncertainty and fear, or by writing into restrictive legislation our hopes for the future without taking the time or the pains to check them against the experience of past years to see if they are within reach or not. It can be retarded by such a law as the tax on undistributed profits which has inflicted a definite hardship on thousands of corporations of medium size. It has practically forced the distribution of assets which should be conserved to replace those lost during the last depression. In the machine tool industry alone, a cross-sectional check indicated that our companies lost 40 per cent of their capital assets during those difficult years. What is to happen if we have another depression in the future, and go into it with limited assets so that we cannot hold together the nucleus of highly trained personnel which means so much to the machine tool builder? It is not helpful to suggest that he can go out and sell stock in his company, because during a depression no one can sell stock at a reasonable price, nor can he at that time borrow money from a bank.

Duty to Foster Better Understanding of Machinery's Part

It is the duty of every one of us who understands these fundamental facts to emphasize them and see that they are more widely understood. We are no longer a sprawling, disjointed group of states, but a closely knit industrial community. Even the farmer uses mechanical equipment in the fields and in his home. He gets his market quotations by radio and sells his products across the continent. This is in every sense of the word an industrial nation, and very few of us are selling to a local market. A tremendous distribution of farm products can easily be noted in any grocery store, where apples from Oregon, oranges from California and grape-

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SPRING RETURN VALVE

gives instant reversal of cylinder upon release of the foot pedal, for quick, positive control of air operated equipment. The operator's hands are free for other work.

Hannifin "Pack-Less" disc-type Air Control Valves have no packing—and no leakage or packing maintenance troubles.

Made in 3-way and 4-way types, hand and foot operated, manifold, spring return, electric and special types. Write for Valve Bulletin 34-A.

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fruit from Florida are offered side by side.

Business men must learn to think in terms of the nation and must pass the results of this thinking on to those who should profit by our experience. I hope that as we have worked together to overcome technical difficulties we can cooperate in developing a better public understanding of the part machinery has played in this industrial nation, and that our future lies in using it more widely and more effectively.

Fundamentals of Safety In Steel Plants

(CONTINUED FROM PAGE 43)

workman's attitude towards safety depends absolutely on the attitude of the foreman. If he is indifferent, the men will be indifferent. But if he believes in safety, if by what he says and does each day he convinces his men that he is in earnest and is doing everything in his power to protect them, the foreman will get his men with him."

Many serious accidents to new men are due to physical and mental defects which might have been discovered by proper examination. Such defects also account for the fact that some men are much more liable to injury than others. An applicant may be able to perform a certain job with safety to himself and his fellow men, but may be an absolute menace if permitted to try another job for which he is not physically suited. The choice of new applicants for jobs should not be made until they have undergone a thorough physical and mental examination to determine whether they have the necessary qualifications for the job. Periodic examinations of the entire working force should also be made for like reasons.

Prompt and expert surgical attention saves many lives and often returns men to the job who would otherwise have been permanently and totally disabled. Training of men to report for treatment of minor cuts and bruises has resulted in the practical elimination of cases of infection. It is, therefore, essential to have an efficient and thoroughly trained medical and surgical staff, subject to immediate call for the care of emergency cases.

First aid training schools have contributed much, in this latter respect, to the safety movement in the steel industry. In such schools classes of volunteer recruits from the working forces are carefully trained in all of the essential first aid practices, and such trained men scattered throughout the

plants are able to render most valuable assistance in emergency cases.

The question of continued and energetic accident-prevention work is especially important at the present time. Renewed industrial activity, with the attendant employment of many workers in tasks

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with which they are not familiar, will greatly increase the occupational hazards, even where conditions are rendered as safe as possible. Reduction or laxness in safety work will increase these hazards still further, exact their toll of injuries and suffering, and prevent efficient and economic operation of the industry.

With respect to the method of conducting safety and accident pre-

vention programs, a recent survey has shown that 108 companies covering 403,000 employees made use of safety posters and bulletins as a part of their safety program; 86 companies distributed safety literature; 82 companies held regular employees' conferences on safety; 75 companies had regularly organized safety committees in the various plants; 86 companies gave safety instruction on the job; 42

companies conducted regular inter-department competitions in safety and accident prevention; 34 companies gave safety awards for the best safety records or greatest improvement in safety ratings during the year; and 77 companies used disciplinary measures in their campaigns to eliminate accidents due to carelessness or neglect.

The mere recital of the "high spots" in the actual war against accidents in the iron and steel industry has served to point out the fundamentals of safety and accident prevention, and shows clearly that safety has become a vital force in our industrial life. There will be little or no disagreement as to such fundamentals, but there may be considerable difference of opinion as to their relative importance in the work.

In our opinion the fundamentals, named in the order of their importance, are: First: Proper attitude of our chief executives toward safety and their continued interest in safety. Second: A safe place in which to work and safe working conditions. Third: The foreman, with all that the word implies in this work. Fourth: Careful choice of new employees, and their proper training. Fifth: Safety organizations encouraged by top management. Sixth: General educational program on safety for all employees.

Suggested Safety Campaign

I suggest the following safety program to be sponsored by the American Iron and Steel Institute and to be put into effect as soon as possible in the interests of all members of the industry, and especially of those members which have not yet developed their safety programs to the highest possible standards.

(1) Give to the public the complete history of the safety movement, and claim for the steel industry the full credit due for the leading part it has always taken and for the great advances that have been made. Cooperate with the National Safety Council in preparing the story.

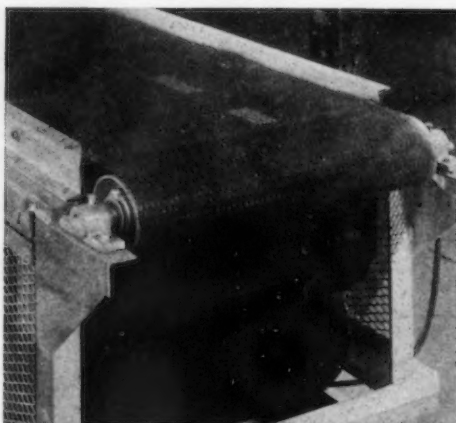
(2) Make a survey of the steel industry and determine which companies have well organized safety programs and which companies do not have such programs.

(3) Appoint a safety committee and engage the services of a well trained safety engineer familiar

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with best practices in the steel industry. Develop a program of field work to secure 100 per cent cooperation of all companies in safety work.

(4) When interest has been widely stimulated, stage a contest with offer of a prize for best performance in the industry. This would involve the keeping of special records by the Institute or by the National Safety Council.

(5) Stimulate more interest in accident prevention by all members of the industry. Make discussion of safety a part of the program for all meetings of iron and steel men. Give more attention to safety in publications for the industry.

Provide a better interpretation of safety in the industrial and public relations policies of the industry.

Urge all companies to cooperate with the National Safety Council and benefit by its services.

In closing I would paraphrase the statement of the immortal Jefferson and say, "Eternal vigilance of every man in the industry is the price of safety."



Providence, R. I., has awarded 100 tons of 6 and 8-in. to Warren Foundry & Pipe Corp.

Board of Awards, Baltimore, asks bids until June 16 for 30-in. pipe for main trunk water line under Curtis Creek. Leon Small is city water engineer. Cost about \$120,000.

Leakesville, Miss., plans pipe lines for water system and other waterworks installation. Fund of about \$55,000 is being arranged for this and new sewerage lines. W. E. Mallett, Jr., Millsaps Building, Jackson, Miss., is consulting engineer.

Billings, Mont., closes bids June 16 for 4860 ft., various sizes, for extensions in water system in Rural Improvement Districts Nos. 34 and 35. C. E. Wicks is chairman of board, in charge. C. E. Durland, Billings, is engineer.

Pomeroy, Ohio, plans pipe lines for Water System and other waterworks installation. Cost about \$125,000. Financing will be arranged through Federal aid. C. J. Hess, mayor, is in charge.

Dresser Junction, Wis., closes bids June 11 on new waterworks system requiring 11,000 ft. of 4 to 12-in. water mains.

Beulah, Colo., plans 8-in. pipe from source of water supply at Beulah Soda Springs to storage reservoir. Cost about \$27,000. Financing has been arranged through Federal aid.

Wellsville, Ohio, will take bids soon for pipe for water system; also for steel standpipe, filtration plant and other waterworks installation. Cost about \$149,400. Financing has been arranged through

Federal aid. R. H. Hunter, Wooster, Ohio, is consulting engineer.

Circle, Mont., closes bids June 11 for 18,400 ft. of 2, 4 and 6-in. for water system; also for 75,000-gal. elevated steel tank and tower, pipe line fittings, valves, hydrants, etc. Virgil A. Weidemann, Circle, is engineer.

Cosmos, Minn., plans pipe lines for water system; also elevated steel tank and tower. Cost about \$27,000. Financing has been arranged through Federal aid. Ealy G. Briggs, 1955 University Avenue, St. Paul, Minn., is consulting engineer.

Ogden, Utah, plans purchase of 18 and 20-in. pipe for extensions in main water

distribution lines in southern part of city. Cost about \$72,400. Financing is being arranged through Federal aid. E. T. Saunders is water commissioner.

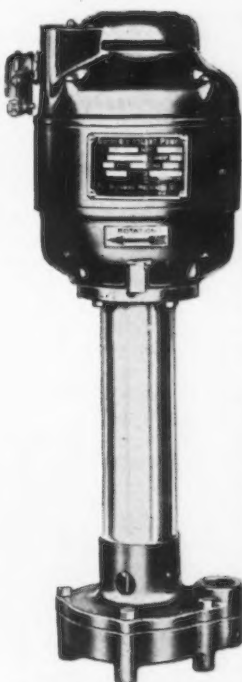
Murdock, Minn., has plans for pipe lines for water system and other waterworks installation, including elevated steel tank. Ealy G. Briggs, 1955 University Avenue, St. Paul, Minn., is consulting engineer.

Los Angeles Metropolitan Water District, Los Angeles, has awarded 476 tons of 4, 6 and 12-in. to National Cast Iron Pipe Co.

San Francisco will open bids June 14 on 835 tons of 2 to 16-in. pipe for a city project.

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circulate liquids containing abrasives, without any injury to the Pump. Throttling does not build up pressure, nor increase the load on the driving motor. Data sheets will be submitted upon request.

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537 EAST FRONT ST., CINCINNATI, OHIO

Steel Ingot Output Higher in May Despite Shutdowns Caused by Strikes

STEEL ingot production in May totaled 5,153,559 gross tons, an increase of 81,684 tons over April's production of 5,071,875 tons, according to the American Iron and Steel Institute. The gain was recorded in spite of the fact that the output of four steel com-

panies was affected by labor difficulties in May, chiefly during the last five days of the month.

Total tonnage produced in May was exceeded in only two previous months—in May, 1929, when the all-time record of 5,286,246 tons was established, and in March of this year, when output amounted to 5,216,666 gross tons. Last month was the third consecutive one in which production exceeded 5,000,000 tons. The output for the month was 27.6 per cent larger than the production for May, 1936. For the first five months of the year, the total was 24,580,871, or 42.1 per cent more than in the corresponding period of last year.

Owing to the fact that there was one more working day in May than in April, the operating rate for May, 88.82 per cent of capacity, was lower than the April figure of 90.27 per cent. In May, 1936, the industry operated at 69.58 per cent of capacity.

An average of 1,163,332 gross tons of ingots was produced per

week during May, compared with 1,182,255 tons in April, and with 911,371 tons in May, 1936.



Norfolk & Western has placed an order for 650 box car underframes with Bethlehem Steel Corp. and has ordered 50 hopper cars from American Car & Foundry Co. A repair program entails 1350 cars. This railroad will build in its own shops, 10 freight locomotives, 10 70-ton hopper cars, and 20 cabooses, at an approximate cost of \$1,600,000.

Chicago, Rock Island & Pacific has ordered 10 passenger coaches from Pullman Standard Car Mfg. Co.

East Erie Commercial has ordered one diesel-electric locomotive from General Electric Co.

Chicago & North Western has ordered one 4-6-4 type locomotive from American Locomotive Co.

Milwaukee Electric Railway & Light Co., Milwaukee, has placed contract with St. Louis Car Co., St. Louis, for 44 trolley buses costing \$550,000, each seating 41 passengers, for delivery early in September.

American Car & Foundry Motors Co. has received an order from Memphis Street Railway Co., Memphis, Tenn., for 30 motor coaches powered with Hall-Scott horizontal engine.

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PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS (Reported by Companies Which in 1936 Made 98.29 Per Cent of the Open-Hearth and 100 Per Cent of the Bessemer Ingot Production)

	Reported Production (Gross Tons)		Calculated Monthly Production All Companies		Number of Weeks	Per Cent of Capacity
	Open-Hearth	Bessemer	Monthly	Weekly		
1936						
January	2,794,766	196,389	3,039,804	686,186	4.43	52.39
February	2,707,320	202,445	2,956,891	714,225	4.14	54.53
March	3,094,939	185,040	3,333,853	752,563	4.43	57.46
1st Quarter	8,597,025	583,874	9,330,548	717,734	13.00	54.80
April	3,565,761	304,775	3,932,605	914,593	4.29	69.99
May	3,671,375	302,092	4,037,375	911,371	4.43	69.58
June	3,578,383	334,897	3,975,569	926,706	4.29	70.75
2nd Quarter	10,815,519	941,764	11,945,549	918,182	13.01	70.10
1st 6 Months	19,412,544	1,525,638	21,276,097	817,997	26.01	62.45
July	3,526,380	326,606	3,914,370	885,604	4.42	67.61
August	3,768,135	350,560	4,184,287	944,534	4.43	72.11
September	3,782,498	303,048	4,151,388	969,950	4.28	74.05
3rd Quarter	11,077,013	980,214	12,250,045	932,981	13.13	71.23
1st 9 Months	30,489,557	2,505,852	33,526,142	856,570	39.14	65.40
October	4,144,395	317,710	4,534,246	1,023,532	4.43	78.15
November	3,925,146	329,553	4,323,025	1,007,698	4.29	76.94
December	4,048,552	305,342	4,424,367	1,000,988	4.42	76.42
4th Quarter	12,118,093	952,605	13,281,638	1,010,779	13.14	77.17
Total Year	42,607,650	3,458,457	46,807,780	895,329	52.28	68.36
1937						
January	4,357,338	291,794	4,724,939	1,066,578	4.43	81.43
February	4,012,358	331,669	4,413,832	1,103,458	4.00	84.25
March	4,730,579	403,787	5,216,666	1,177,577	4.43	89.91
1st Quarter	13,100,275	1,027,250	14,355,437	1,116,286	12.86	85.23
April	4,601,620	390,198	5,071,875	1,182,255	4.29	90.27
May	4,685,749	386,290	5,153,559	1,163,332	4.43	88.82

1936 figures revised.

John L. Lewis Favors Wage-Hour Bill But Suggests Some Modifications

(Further details of hearings on wage-hour bill will be found in Washington report elsewhere in this issue.)

WASHINGTON, June 8.—John L. Lewis told the joint Senate and House Committee on Labor yesterday that the Committee for Industrial Organization will support the administration's Black-Connery bill. But he found some objections to it. The chief point of attack was the wide powers it proposes to hand over to the proposed five-man National Labor Standards Board.

In urging deletion of Sec. 5 of the bill authorizing the board to fix and vary minimum wages and maximum hours, Lewis, pushing responsibility on Congress itself, rather than passing it over to the board, asked that the bill specify a maximum work week of 35 hr. of five 7-hr. days, with the board given discretion to authorize a 40-hr. week in other cases.

In taking this position, of course, Lewis differs with the prevailing view of industry, which contends an abrupt, general reduction in hours under 40 would be ruinous by raising costs beyond the ability of purchasers to consume. Lewis said that the minimum wage and maximum hour provisions of the bill are "a modest beginning of general planning toward a better economic order." He asked for a minimum of 40c. an hr. as a basic pay, making a weekly wage of \$14, which Lewis said also should hold for any cases in which the board should order a 39-hr. week, to be increased to \$16 in cases where the board might permit a 40-hr. week.

He was in agreement with Secretary of Labor Frances Perkins and President William Green of the American Federation of Labor in "firmly" opposing geographical differentials, a point that promises to develop sharp dispute because of Southern insistence on lower wages for the South than those applying in the North. He was in agreement with Miss Perkins and Green in urging elimination of the provision exempting employers of a small number of employees, eight or less. But he was in disagreement with Green on the provision in the Connery bill which would place production of imports under the same wage and hour standards as those applying to domestic producers. Lewis undoubtedly reflected the administration view when he said that "I believe if anything is done about that matter it should wait until suffi-

cient figures are available from actual experience to show which is actually needed."

The Lewis comment was not directed specifically at the Connery provision but rather to its equivalent, a proposal by Senator

Ellender, of Louisiana, for an amendment for compensatory tariff revision to offset increases in wages.

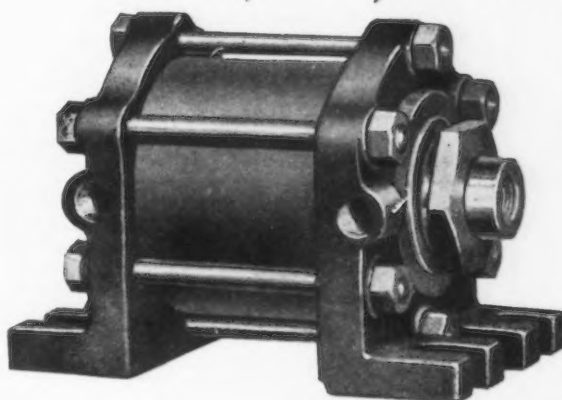
Senator LaFollette, of Wisconsin, warm CIO supporter, also differed with Lewis regarding elimination of Sec. 5. LaFollette pointed out that without this section the board would not have power to enter a situation where workers might be employed under contract at wages less than the established minimum.

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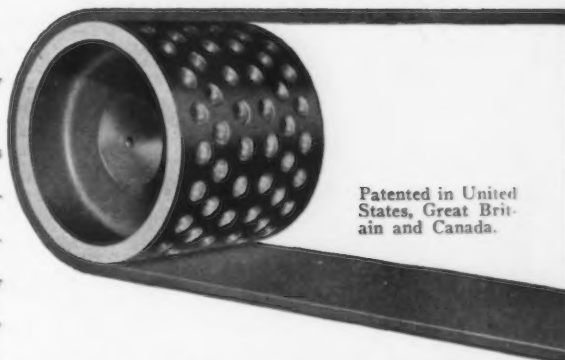
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628 N. Mechanic Street, Jackson, Michigan

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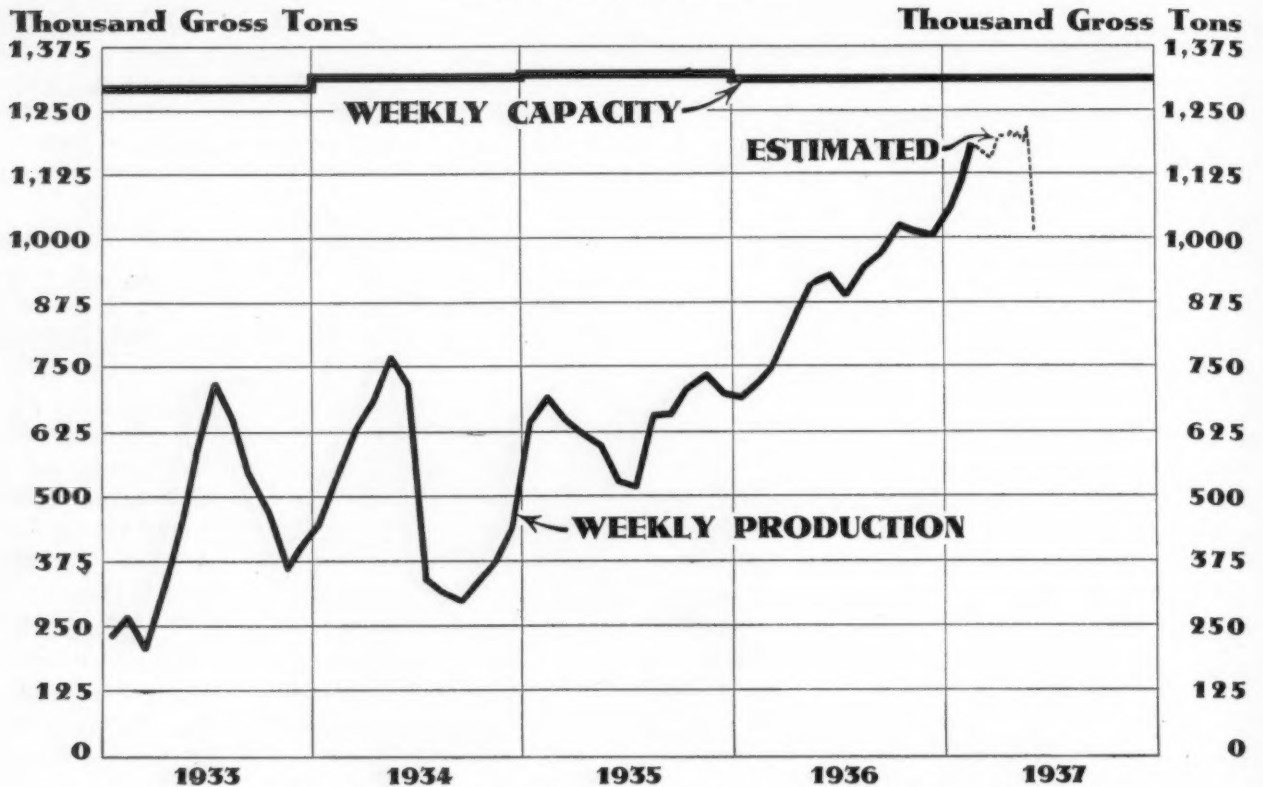
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DETROIT, MICH.

"A Belt Never Squealed on a Vacuum Cup Pulley"

PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

	Current Week	Last Week
Pittsburgh	93.0	93.0
Chicago	63.0	63.0
Valleys	45.0	45.0
Philadelphia	69.0	69.0
Cleveland	56.0	55.0
Buffalo	95.5	95.5
Wheeling	100.0	100.0
Southern	78.5	73.5
Ohio River	95.5	92.5
Western	95.0	95.0
St. Louis	93.0	88.5
Detroit	100.0	100.0
Eastern	70.0	98.0
Aggregate	78.0	77.5

Weekly Booking of Construction Steel

	June 8, 1937	June 2, 1937	Week Ended May 11, 1937	June 9, 1936	Year to Date 1937	1936
Fabricated structural steel awards.....	24,650	30,900	15,970	15,800	553,565	465,800
Fabricated plate awards.....	0	0	315	9,470	58,015	135,155
Steel sheet piling awards.....	0	14,430	0	790	31,305	17,765
Reinforcing bar awards.....	7,300	6,130	16,415	4,265	100,535	164,845
Total Lettings of Construction Steel....	31,950	51,460	32,700	30,325	743,420	783,565

...SUMMARY OF THE WEEK...

... Ingot output gains slightly at some plants unaffected by strikes.

o o o

... Except for shutdowns, May output would have surpassed May, 1929, record.

o o o

... New business declining at more rapid rate than last month.

STRIKES at plants of three major steel companies have caused no further reduction in the aggregate volume of ingot output. On the contrary, there have been gains at some unaffected plants, bringing the estimated average for the country to 78 per cent, a slight rise over last week. At Youngstown the rate remains at 45 per cent, and Chicago is unchanged at 63 per cent, but a rise of one point has occurred in the Cleveland-Lorain district, and there have been gains also in the South, in southern Ohio and at St. Louis. The Buffalo district is virtually unaffected by strike.

Had it not been for strikes in the last week of May, that month's steel ingot output would have surpassed the all-time record of 5,286,246 gross tons in May, 1929. As it was, the May total of 5,153,559 tons was only 132,687 tons below that figure and only 63,067 tons below the March total, which, except for May, 1929, was the highest on record.

The strikes have caused surprisingly little change in market conditions in the steel industry. Only a negligible amount of business has been switched from strike-affected companies to those that are operating, indicating that consumers have ample stocks for the present and are not being seriously inconvenienced. If the strikes last another two or three weeks, this situation undoubtedly will change.

MEANWHILE, incoming business in general is declining this month. While May volume for most companies represented a fairly large percentage of their shipments, the trend so far in June has been more sharply downward, orders in the aggregate having been smaller in the first week of this month than in the corresponding pe-

riod of May. The acceleration of the rate of decline in new business is not attributed solely to seasonal influences, but to apprehension in many quarters over persistent and oftentimes unlawful labor agitation, together with the seeming indifference of the Washington administration over the rights or wrongs involved.

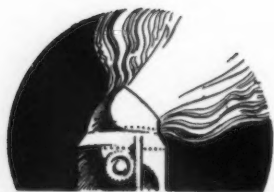
The scrap market, as usual a sensitive barometer, reflects the strike situation in a further sharp decline at Chicago, amounting to \$1 a ton on some grades, bringing THE IRON AGE composite price down to \$17.42, the low point of the year thus far and the lowest since mid-December, 1936.

Some of the present decline in steel business is due to the seasonal slowing down of the automobile industry, particularly parts makers, in preparation for the changeover to new models, and there has been some reduction in the volume of new business from miscellaneous users that are liquidating present stocks. On the other hand, the farm machinery trade is likely to maintain its current high pace for 60 days and is taking steel freely. Can makers are taking all the tin plate they can get. Plates for tanks are in good demand and the structural steel volume is fairly good, although some jobs are being withdrawn because of inability to obtain Federal funds.

LETTINGS of fabricated structural steel totaled about 27,000 tons, of which 8000 tons is for an International Harvester Co. plant at Indianapolis, 3300 tons for a bridge at Baltimore and 1800 tons for a bridge in Pennsylvania. New projects of 19,000 tons include 6800 tons for the Whitestone-Bronx bridge, New York, 3200 tons for the Memorial Hospital, New York, 2950 tons for the East River Drive, New York, and 1200 tons for TVA dams in Tennessee. Reinforcing steel awards were 7300 tons, with 9750 tons listed in new jobs.

Railroad equipment inquiries have dwindled almost to nothing, but the Norfolk & Western will repair 1350 or more cars and build 10 locomotives and 30 cars in its own shops. Predictions of weekly carloadings of 900,000 by fall indicate a new buying movement in railroad equipment within coming months.

Export inquiry for steel and pig iron has revived. Sales of 100,000 tons or more of ingots are reported, a transaction of 70,000 tons being authenticated. Inquiries from abroad totaling 90,000 tons of pig iron have also been circulated. Pig iron sales for third quarter, though quietly consummated, have been in good volume, with some furnaces virtually sold up to September or October.



...PITTSBURGH...

... Ingot output unchanged, although new business continues to decline moderately.

o o o

... Amount of steel tonnage diverted because of strike conditions is very small.

o o o

... 70,000 tons of ingots sold for export; pig iron inquiry for 90,000 tons.

PITTSBURGH, June 8.—Ingot operations in the Pittsburgh district continue unchanged at 93 per cent of capacity, but some plants are operating a shade better than a week ago. There is little indication that output will fall much, if any, below current levels for the next few weeks at least. The Wheeling district rate continues at 100 per cent of capacity.

New business in the past week shows little change, and the opinion persists that the volume of incoming orders is about scraping bottom. Within the past few days bookings for semi-finished steel and sheets have been larger than in the early part of the week.

An export order for 70,000 tons of steel ingots was closed recently and was divided between two mills, one of which is in the Pittsburgh district. There are indications that one or two additional orders were placed since the first transaction and the tonnage is reported to be considerable. Export inquiry, which had apparently slowed up somewhat, has taken on new activity at least as far as pig iron is concerned. Some interests have been inquiring in this district for as much as 90,000 tons of pig iron, but no local producers participated.

Specifications for bars and wide strip are off somewhat, but a resumption of automobile purchases for 1938 models is looked for in the near future. A fair amount of cold rolled sheet buying from the automotive field has materialized and, as a result, one producer has extended its promises on this grade an additional two weeks. General line grades of sheets are being promised by the leading producer in about two weeks, less time than

was the case a few weeks ago. Structural plate and shape specifications have stepped up considerably in the past week and backlogs are being worked off slowly. Total bookings of steel products are running slightly ahead of the early part of May and are roughly about 70 per cent of shipments.

Outstanding concrete bar awards in the past week involve 4700 tons for a Nebraska dam that was taken by Sheffield Steel Corp.

Tin plate operations continue at 85 to 88 per cent of capacity, with considerable pressure for shipments being placed on unaffected plants.

As a result of labor tie-ups and the blowing out of a local steel stack, considerable accumulations of beehive furnace coke have materialized in the Connellsville region. Producers are gaging production to consumption by taking off several coke plants and cutting the working time on others from six days to four days a week.

Total volume of orders diverted to this district on account of strike conditions is still small.

Pig Iron

Current shipments continue heavy and, with orders already on the books plus the hand-to-mouth buying now taking place, producers are having little chance to build up inventories. There is good reason to believe that active foreign inquiries will prevent any easing up of pig iron supplies. Even though buying practices revert to carload lots, consumption has been so little affected that total shipments will keep producers busy. Export inquiries seem to be

increasing and in the past week 15,000 tons was asked for from one country while a request from France involved 75,000 tons of foundry iron. Neither of these inquiries was satisfied in this district owing to the heavy domestic requirements. The local situation has also tightened up considerably owing to the blowing out of a steel stack for necessary repairs.

Semi-Finished Steel

An export order has been placed by a New York broker for 70,000 tons of steel ingots at a price substantially above that obtained for average ingot stock. The material is of a special shape and quality and was made specifically for the order in question. Two steel companies, one of which is located in the Pittsburgh district, shared the order. Meanwhile, total business in the past week was about the same volume as in the previous week. There has been no indication of a sharp falling off of semi-finished steel specifications, but backlogs are slightly easier as shipments have gained some on incoming business during the last few weeks. Both shipments and specifications for sheet and tin bars are at a good pace.

Cold-Finished Bars

Aggregate specifications in the past week were about on a par with the previous period and business for the most part comes from miscellaneous sources. Some automobile buying is in progress and represents cleanup items on 1937 models. New purchases for 1938 models are expected some time next month. Meanwhile shipments continue a little easier except for certain sizes and finishes, some of which are not obtainable in less than four weeks.

Bolts, Nuts and Rivets

Although local producers are operating at or close to capacity, backlogs are being worked down and, if new business does not come in any faster than during the last month or so, production will be stepped down in the near future. Some car shops are fairly well cleaned up on orders and this condition is reflected in specifications from these sources. Although auto buying has dwindled, purchases for 1938 models are expected some time next month. New business consists chiefly of miscellaneous tonnages.

Bars

Hot rolled bar business is off somewhat this week and present bookings constitute actual requirements from a varied number of

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous;
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	June 8, 1937	June 2, 1937	May 11, 1937	June 9, 1936
Rails, heavy, at mill.....	\$42.50	\$42.50	\$42.50	\$36.37 1/2
Light rails, Pittsburgh.....	43.00	43.00	43.00	35.00
Rerolling billets, Pittsburgh..	37.00	37.00	37.00	28.00
Sheet bars, Pittsburgh.....	37.00	37.00	37.00	28.00
Slabs, Pittsburgh.....	37.00	37.00	37.00	28.00
Forging billets, Pittsburgh..	43.00	43.00	43.00	35.00
Wire rods, Nos. 4 and 5, P'gh	47.00	47.00	47.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb...	2.10	2.10	2.10	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	2.45	2.45	2.45	1.85
Bars, Chicago.....	2.50	2.50	2.50	1.90
Bars, Cleveland.....	2.50	2.50	2.50	1.90
Bars, New York.....	2.78	2.78	2.78	2.20
Plates, Pittsburgh.....	2.25	2.25	2.25	1.80
Plates, Chicago.....	2.30	2.30	2.30	1.85
Plates, New York.....	2.53	2.53	2.53	2.09
Structural shapes, Pittsburgh	2.25	2.25	2.25	1.80
Structural shapes, Chicago..	2.30	2.30	2.30	1.85
Structural shapes, New York	2.5025	2.5025	2.5025	2.06 1/4
Cold-finished bars, Pittsburgh	2.90	2.90	2.90	2.10
Hot-rolled strips, Pittsburgh.	2.40	2.40	2.40	1.85
Cold-rolled strips, Pittsburgh	3.20	3.20	3.20	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	3.15	3.15	3.15	2.40
Hot-rolled annealed sheets, No. 24, Gary.....	3.25	3.25	3.25	2.50
Sheets, galv., No. 24, P'gh..	3.80	3.80	3.80	3.10
Sheets, galv., No. 24, Gary..	3.90	3.90	3.90	3.20
Hot-rolled sheets, No. 10, Pittsburgh.....	2.40	2.40	2.40	1.85
Hot-rolled sheets, No. 10, Gary.....	2.50	2.50	2.50	1.95
Cold-rolled sheets, No. 20, Pittsburgh.....	3.55	3.55	3.55	2.95
Cold-rolled sheets, No. 20, Gary.....	3.65	3.65	3.65	3.05
Wire nails, Pittsburgh.....	2.75	2.75	2.75	2.10
Wire nails, Chicago dist. mill	2.80	2.80	2.80	2.15
Plain wire, Pittsburgh.....	2.90	2.90	2.90	2.40
Plain wire, Chicago dist. mill	2.95	2.95	2.95	2.45
Barbed wire, galv., P'gh....	3.40	3.40	3.40	2.60
Barbed wire, galv., Chicago dist. mill.....	3.45	3.45	3.45	2.65
Tin plate, 100-lb. box, P'gh..	\$5.35	\$5.35	\$5.35	\$5.25

Pig Iron

Per Gross Ton:	June 8, 1937	June 2, 1937	May 11, 1937	June 9, 1936
No. 2 fdy., Philadelphia.....	\$25.76	\$25.76	\$25.76	\$21.3132
No. 2, Valley furnace.....	24.00	24.00	24.00	19.50
No. 2, Southern Cin'ti.....	23.69	23.69	23.69	20.2007
No. 2, Birmingham.....	20.38	20.38	20.38	15.50
No. 2, foundry, Chicago*.....	24.00	24.00	24.00	19.50
Basic, del'd eastern Pa.....	25.26	25.26	25.26	20.8132
Basic, Valley furnace.....	23.50	23.50	23.50	19.00
Malleable, Chicago*.....	24.00	24.00	24.00	19.50
Malleable, Valley.....	24.00	24.00	24.00	19.50
L. S. charcoal, Chicago.....	30.04	30.04	30.04	25.2528
Ferromanganese, seab'd, car- lots.....	102.50	102.50	102.50	75.00

*This quotation is subject to a deduction of 38c. a ton for phosphorus content of 70 per cent or higher.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh....	\$18.75	\$18.75	\$19.75	\$13.25
Heavy melting steel, Phila...	17.75	17.75	19.25	12.00
Heavy melting steel, Ch'go...	15.75	16.75	17.25	12.75
Carwheels, Chicago.....	18.25	19.25	19.75	13.50
Carwheels, Philadelphia.....	19.75	19.75	21.25	13.75
No. 1 cast, Pittsburgh.....	19.25	19.25	19.75	14.75
No. 1 cast, Philadelphia.....	20.25	20.25	21.25	14.00
No. 1 cast, Ch'go (net ton)...	15.25	15.25	15.25	12.00
No. 1 RR. wrot., Phila.....	19.75	19.75	19.75	14.75
No. 1 RR. wrot., Ch'go (net)	15.00	15.25	15.25	11.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt.....	\$4.60	\$4.60	\$4.60	\$3.65
Foundry coke, prompt.....	5.25	5.25	5.25	4.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn....	14.00	14.00	14.00	9.50
Lake copper, New York.....	14.12 1/2	14.12 1/2	14.12 1/2	9.62 1/2
Tin (Straits), New York.....	56.00	56.25	54.75	42.50
Zinc, East St. Louis.....	6.75	6.75	6.75	4.90
Zinc, New York.....	7.10	7.10	7.10	5.27 1/2
Lead, St. Louis.....	5.85	5.85	5.85	4.45
Lead, New York.....	6.00	6.00	6.00	4.60
Antimony (Asiatic), N. Y....	14.75	15.00	14.50	13.50

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

Finished Steel

June 8, 1937
One week ago
One month ago
One year ago

2.605c. a Lb.
2.605c.
2.605c.
2.097c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Pig Iron

\$23.25 a Gross Ton
23.25
23.25
18.84

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Steel Scrap

\$17.42 a Gross Ton
17.75
18.75
12.67

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	HIGH	LOW
1937.....	2.605c., Mar. 9;	2.330c., Mar. 2
1936.....	2.330c., Dec. 28;	2.084c., Mar. 10
1935.....	2.130c., Oct. 1;	2.124c., Jan. 8
1934.....	2.199c., April 24;	2.008c., Jan. 2
1933.....	2.015c., Oct. 3;	1.867c., April 18
1932.....	1.977c., Oct. 4;	1.926c., Feb. 2
1931.....	2.037c., Jan. 13;	1.945c., Dec. 29
1930.....	2.273c., Jan. 7;	2.018c., Dec. 9
1929.....	2.317c., April 2;	2.273c., Oct. 29
1928.....	2.286c., Dec. 11;	2.217c., July 17
1927.....	2.402c., Jan. 4;	2.212c., Nov. 1

	HIGH	LOW
\$23.25, Mar. 9;	\$20.25, Feb. 16	
19.73, Nov. 24;	18.73, Aug. 11	
18.84, Nov. 5;	17.83, May 14	
17.90, May 1;	16.90, Jan. 27	
16.90, Dec. 5;	13.56, Jan. 3	
14.81, Jan. 5;	13.56, Dec. 6	
15.90, Jan. 6;	14.79, Dec. 15	
18.21, Jan. 7;	15.90, Dec. 16	
18.71, May 14;	18.21, Dec. 17	
18.59, Nov. 27;	17.04, July 24	
19.71, Jan. 4;	17.54, Nov. 1	

	HIGH	LOW
\$21.92, Mar. 30;	\$17.42, June 8	
17.75, Dec. 21;	12.67, June 9	
13.42, Dec. 10;	10.33, April 23	
13.00, Mar. 13;	9.50, Sept. 25	
12.25, Aug. 8;	6.75, Jan. 3	
8.50, Jan. 12;	6.43, July 5	
11.33, Jan. 6;	8.50, Dec. 29	
15.00, Feb. 18;	11.25, Dec. 9	
17.58, Jan. 29;	14.08, Dec. 3	
16.50, Dec. 31;	13.08, July 2	
15.25, Jan. 11;	13.08, Nov. 22	

sources. Auto buying has fallen off owing to the changeover period, but commitments for 1938 models are expected to start coming in within the next month or so. The amount of business diverted to this district because of strike shutdowns in other areas so far has been negligible, but should the deadlock continue for a month longer a far different picture might present itself. Shipments have gained on incoming business in the past few weeks and as a result deliveries are easier.

Reinforcing Bars

The award involving 4700 tons for the Keystone dam in Nebraska went to Sheffield Steel Corp., Kansas City. New business includes 5000 tons of reinforcing bars for a model naval testing plant near Cabin John, Md., and 1200 tons for a Treasury printing department building, Washington. A considerable number of jobs are pending and aggregate specifications to the mills are in fair volume.

Plates and Shapes

Structural inquiries and awards were exceptionally light during the past week and were no doubt affected by the holiday season. Two outstanding inquiries requiring 3000 tons each are for factory buildings at Painesville, Ohio, and a General Motors manufacturing building at McCook, Ill. Publicly financed projects included 6800 tons for towers for the Bronx-Whitestone bridge, New York, and 3200 tons for a hospital at New York. Structural plate and shape specifications were somewhat better in the past week than during the previous period.

Railroad Buying

Chicago, Rock Island & Pacific has purchased 10 coaches from the Pullman-Standard Car Mfg. Co. New buying continues at low ebb, but in view of the known requirements observers feel that renewed railroad business must be forthcoming soon. While some car shops are well filled with orders, a number of others are rapidly working down backlogs.

Sheets

General line sheet business in the past week was off somewhat from the previous period, but within the past few days there is evidence that orders from automotive sources will more than offset the loss in total business. Backlogs have eased some and one large producer is able to give about two weeks better shipment on such grades as hot rolled and hot rolled annealed, but, on the other hand, promises on cold rolled sheets are about a week to two weeks longer,

making these grades obtainable in about eight to nine weeks. The amount of tonnage involved in orders diverted to unaffected plants continues small. In some cases where business is usually divided, a large share is going to producers who are able to make delivery.

Tubular Products

Total tubular business, if anything, was slightly better in the past week. Not much change was noted in the volume of standard pipe business, but oil-country goods specifications were slightly better. Orders for line pipe are just about holding their own and some pipe line projects requiring considerable tonnage remain in the "conversational" stage. Some producers have been able to build up some of their inventories which were sadly depleted in March, but they are still far from the normal amount of stock kept on hand.

Wire Products

Manufacturers' wire specifications are holding up well and the miscellaneous character of orders is noticeable. Total bookings are not as great as two months ago, but they are sufficient to prevent a rapid working off of backlogs. Seasonal conditions still influence merchant wire business. Some jobbers, however, have had their stocks depleted faster than they had anticipated and as a result are actively specifying.

Strip

Orders for wide strip steel are lighter, but the total volume of orders booked for other sizes is down only slightly from a week ago. Shipments are a little easier and three-week promises, or better, on hot rolled are numerous. The bulk of new business is of a miscellaneous character, but some buying is being done by automobile parts makers, presumably for 1938 models. The tonnage involved, however, is not very heavy and automobile buying on a larger scale is not expected much before next month.

Coal and Coke

Owing to steel plant shutdowns, beehive furnace coke has accumulated in the Connellsville regions. In order to maintain production more in line with actual consumption, some coke plants have been shut down while the majority of others are working four days a week instead of six. With practically all beehive furnace coke going on contract orders for which prices have been permitted, no change in the price level of this grade has materialized. There is undoubtedly some shading on small spot sales to consumers such as

water gas companies, etc., but tonnages involved are negligible. Previous to the steel strikes, coke market activity had receded some and the actual appearance of labor difficulties has had a conservative effect on other buyers. The blowing out of a local steel stack will also add to present accumulations.

Tin Plate

Shipments to consumers are exceptionally heavy and consumption appears to be on the upgrade. While it is too early to forecast crop conditions, the general opinion is that packers will have a better season than last year. Operations for the country as a whole continue at 85 to 88 per cent, owing to curtailment of plants closed by strikes. No apprehension has been felt as yet by tin plate consumers, but a protracted shutdown would, of course, produce serious consequences.



... **Pig iron output at new high for year.**

... **Steel production also at record-breaking level.**

BIRMINGHAM, June 8.—Sloss-Sheffield Steel & Iron Co. blew in its No. 1 furnace last Thursday. This furnace had been out about six weeks for repairs. It increases the district's active total to 17, a new high point for the year. Tennessee Coal, Iron & Railroad Co. is operating seven; Woodward Iron Co., three; Sloss-Sheffield Steel & Iron Co., four, and Republic Steel Corp., three.

Twenty open hearths will operate during part of the week and 19 the remainder. This also is a new high point for the year. The Tennessee Company will work eight and nine at Fairfield; five at Ensley. Republic Steel will operate also six at Gadsden.

Steel and pig iron shipments continue to move out steadily at a substantial rate. No early let-up is in sight, either in production or shipments.

After a recession for three weeks, steel bookings picked up again last week and again exceeded shipments. Steel backlogs are still heavy. There has been a renewal of interest in wire products and roofing sheets, principally for stock.



CHICAGO

... Ingot output remains at 63 per cent; new business is reduced in volume.

o o o

... Large volume of structural steel work, but automotive demand is lessening.

o o o

... Pig iron bookings for third quarter in surprisingly good volume.

CHICAGO, June 8.—There being no increase in production in any of the strike-bound plants in this district, and no changes in operations at the plants not affected by labor difficulties, ingot output remains this week at 63 per cent of capacity.

New business is being received in fair volume, although sales are off from last month's averages. Demand for plates is mostly from tank makers, railroads having quieted down considerably. Specifications from the automobile trade are off in wire and bars, and automobile foundries are reported to be slowing down. Makers of tractors and farm implements, however, are continuing to operate at a high rate of capacity, and it has been estimated that this pace will be maintained for at least another 60 days.

Over 21,000 tons of structural shapes was out for bids this week, this total including an International Harvester plant at Indianapolis to require 8000 tons, a New Orleans hospital to take 7500 tons, 1200 tons for TVA dams in Tennessee, and scattered bridges throughout the West and Middle West. Construction activity generally, however, is only fair, and the withdrawal of some Federal funds which were earmarked for this purpose has had a detrimental effect on consumption of fabricated shapes.

Demand for semi-finished steel is good, but deliveries are poor. It has been reported that orders are being turned down from time to time.

Mills unaffected by the strike are not receiving much business from regular customers of the

struck plants, and state that even if they were solicited to accept this tonnage very little could be taken under present conditions. Schedules are full in nearly all products, with the exception of shapes.

Pig Iron

New business is coming in at a surprisingly good rate, considering the heavy buying of the past few months and the generally high stocks. These are estimated to be sufficient in addition to that iron already on order to last foundries 60 to 90 days. The district melt has not slowed appreciably, although the heavy backlog of orders has decreased considerably. Buyers are content to place orders leisurely now that third quarter prices have been announced, even though there is far from an abundance of available iron.

Sheets

Although sheet activity has been greatly lessened by the strikes, a fair demand has been reported from those mills which are operating. Deliveries are still bad on most grades, although cold rolled sheets may be delivered considerably earlier than can hot rolled, due to open spots in rolling schedules as a result of a decrease in automobile specifying. Hot rolled annealed requires around 20 weeks for delivery, while hot rolled sheets are not much better.

Cast Iron Pipe

About 800 tons of pipe for a city line in Detroit is all the activity this market has shown in the past week. Sales are mostly in lots of two and three carloads, while inquiries include nothing of importance. Prices are firm, although the

business on hand has not been sufficient to afford a real test.

Reinforcing Bars

Reinforcing bar tonnage, both in awards and inquiries, is unimpressive, the largest award to be reported amounting to 590 tons for an armory in St. Louis, which went to Joseph T. Ryerson & Son, Inc. Inquiries include highway work totaling 213 tons in Wisconsin and 194 tons in Illinois, while in Detroit two housing projects, which will require about 1300 tons of bars combined, have not yet been placed. In Pekin, Ill., a Standard Brands, Inc., building will take about 200 tons of bars. A large tonnage is expected to come into this market from the proposed International Harvester project in Indianapolis, but no figures have been released as yet. Prices are reported to be weak, with some sellers outside this immediate territory understood to be encroaching upon this district, and slashing prices as much as \$8 to \$10 a ton.

Foundry Coke

The best indication of foundry activity, now that most customers are securing their iron from stocks, is foundry coke. Shipments the first six days of this month were approximately equal to the same period in May, so apparently no change in operations has been made.

Plates

Plate deliveries are still requiring from 12 to 14 weeks, practically no reduction having been made in this quotation for the past two months. Railroad buying is at a minimum, and no new car building programs are in prospect. With car loadings expected to reach record heights next quarter, some estimates running as high as 900,000 weekly, plate mills are anticipating a great increase in car construction. Tank makers are the most active of the current consumers, and bridges are also consuming fair tonnages.

Structural Shapes

One of the best weeks for some time in shape inquiries was reported this week as over 21,000 tons came out for bids. Outstanding projects are 8,000 tons for an International Harvester plant at Indianapolis, 7,500 tons for a New Orleans charity hospital, 1,200 tons for TVA dams in Tennessee, 840 tons for a bridge at Moline, 800 tons for a Batesville, Ind., bridge, and 600 tons for a similar structure at Astoria, Ore. American Bridge Company was awarded 300 tons for a Linde Air Products building in

South Chicago. Deliveries of plain material average four weeks.

Wire Products

Demand is up slightly over last week, and a leading seller believes the remainder of the summer will continue about as at present, with a relatively sharp increase in bookings in August. The prediction has been made that 1938 will be much better for wire mills than this year, even though 1937 is the best since 1929. Automobile buying is off, although some specifying has been made for experimental work on 1938 models. Tractor and farm implement makers expect to be able to continue their high rate of production another 60 days at least. Response to the fall terms on fencing materials has not been good,

most of the farmers being busy in their fields, but an increase in demand for this class of products is looked for as soon as the crops are in.

Bars

Bar specifications are slightly lower, but mill operations have increased somewhat. Delivery may be had in about 30 days. Farm equipment manufacturers are providing a steady bar demand, but automobile buying has lessened.

Rails

No new rail buying or inquiry has been reported. Some miscellaneous track accessories have been purchased, but not in an appreciable quantity.



FABRICATED STEEL

... Lettings decline to 24,650 tons from 30,900 tons last week.

o o o

... New projects lower at 18,950 tons as against 21,950 tons in the previous week.

NORTH ATLANTIC STATES

North Kennebunk, Me., 400 tons, State bridge, to American Bridge Co.

Manchester, N. H., 110 tons, beams, to Lehigh Structural Steel Co., Allentown, Pa.

Peabody, Mass., 325 tons, Lawrence Leather Co. building, to New England Structural Steel Co., Everett, Mass.

Braintree, Mass., 435 tons, bridge, to American Bridge Co.

New York, 1140 tons, school No. 68, to Harris Structural Steel Co., Plainfield, N. J.

New York, 840 tons, school No. 113, to Lehigh Structural Steel Co.

New York, 970 tons, school No. 115, Bronx, to Bethlehem Steel Corp.

Brooklyn, 590 tons, school No. 131, to Bethlehem Steel Corp.

Menands, N. Y., 125 tons, Boyertown Casket Co., to James McKinney & Son.

Lancaster, N. Y., 230 tons, factory building, Hazel Atlas Glass Co., to Bethlehem Steel Corp.

Clifton, N. J., 250 tons, Clifton Paper Board building, to Joseph T. Ryerson & Son, Inc.

Weissport, Pa., 1800 tons, bridge, to Bethlehem Steel Corp.

Philadelphia, 800 tons, school at 67th Street and Elmwood Avenue, to Bethlehem Steel Corp.

Philadelphia, 100 tons, turntable for Pennsylvania Railroad, to American Bridge Co.

Baltimore, 3330 tons, Howard Street bridge, to American Bridge Co.

SOUTH AND SOUTHWEST

Windsor, W. Va., 750 tons, power house addition, American Gas & Electric Co., to Indiana Bridge Co., Muncie, Pa.

Savannah, Ga., 155 tons, Seaboard Air Line beam spans, to American Bridge Co.

Lake Charles, La., 200 tons, packing plant, to Orange Car & Steel Co., Orange, Tex.

San Juan County, N. M., 990 tons, bridge, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

CENTRAL STATES

Cleveland, 500 tons, plant addition for Lincoln Electric Co., to Austin Co., Cleveland.

Warren, Ohio, 450 tons, plant additions, Packard Electric Co., to Truscon Steel Co.

Cincinnati, 175 tons, Chevrolet Motor Co., to R. C. Mahon Co., Detroit.

Cincinnati, 165 tons, Coca-Cola factory, to Pittsburgh Bridge & Iron Works, Pittsburgh.

Indianapolis, 8000 tons, International Harvester Co., to American Bridge Co.

Chicago, 195 tons, Dennison Mfg. Co. building, to Hansell-Elcock Co., Chicago.

South Chicago, 300 tons, Linde Air Products Co. building, to American Bridge Co.

Dawes County, Neb., 120 tons, I-beam span, to Lincoln Steel Works.

Imperial, Neb., 225 tons, dam Specification 910-D, to St. Louis Structural Steel Co., St. Louis.

WESTERN STATES

Denver, 230 tons, State bridge and approaches, to an unnamed bidder.

Los Angeles, 265 tons, Cudahy Packing Co., to Pacific Iron & Steel Co., Los Angeles.

Long Beach, Cal., 135 tons, industrial arts building, Polytechnic High School, to Pacific Iron & Steel Co.

Stockton, Cal., 250 tons, hospital construction, to Herrick Iron Works.

Emeryville, Cal., 100 tons, building construction, to Herrick Iron Works.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

East Springfield, Mass., 300 tons, Westinghouse Electric & Mfg. Co. foundry.

Bloomfield, Vt., 100 tons, State bridge.

New York, 2510 tons, including 610 tons of silicon steel, New Jersey approach Lincoln Tunnel, New York Port Authority; bids close June 15, contract MHT-23.

New York, 6800 tons, towers, Whitestone-Bronx bridge, Triborough Bridge Authority, contract WB-3; bids close June 23.

New York, 2950 tons, East River Drive, contracts Nos. 3 and 4; Frederick Snare Corp., New York, low bidder.

New York, 3200 tons, building, Memorial Hospital.

Lackawanna, N. Y., tonnage not estimated; Baker Homes housing project.

Cobleskill, N. Y., 750 tons, Delaware & Hudson grade crossing; bids June 15.

Buffalo, 615 tons, sludge tank and disposal building, Buffalo Sewer Authority; bids close June 22.

Cumberland, Md., 300 tons, power station building, Potomac Edison Co.

THE SOUTH

State of Tennessee, 1200 tons, dams for TVA.

River Junction, Fla., 730 tons, State bridges.

Gadsden, Ala., unstated tonnage, extension to open-hearth building of Republic Steel Corp.; inquiry out.

CENTRAL STATES

Batesville, Ind., 800 tons, bridge.

Elgin, Ill., 350 tons, building, McGraw Electric Co.

Chicago, 450 tons, Hyde Park school addition; new bids.

State of Wisconsin, 210 tons, Neshkoro grade separation; bids close June 19.

WESTERN STATES

Missoula, Mont., 132 tons, Fisher River bridge; bids June 17.

Seattle, 300 tons, Ruby Dam; bids about July 1.

Astoria, Ore., 600 tons, bridge.

SHEET PILING

AWARDS

Keystone, Neb., 9400 tons, Keystone dam, tri-county PWA project, to Carnegie-Illinois Steel Corp.; previously reported as 940 tons.



... PHILADELPHIA ...

... Operations unchanged at 69 per cent of capacity.

... New buying almost at a standstill.

... Not much interest in pig iron for third quarter.

PHILADELPHIA, June 8.—Steel sellers here are a little surprised at the dearth of new inquiry, although no one has expressed concern regarding activity over the remainder of the year. Admittedly, the present trend indicates a slackening in activity over the summer months, but there are sufficient orders now on books, albeit rather spotty in some instances, to carry mills through the conventionally slack middle-of-the-summer period. A very busy fall and year-end period is anticipated by all, and the current easiness is being welcomed in some directions as it will permit mills to wipe out many of their older orders and get books in shape for a revival in interest in the second half of the year.

Alan Wood has added a fifth open hearth, but otherwise the district's operating rate shows little alteration. The aggregate rate has not been changed from the 69 per cent of capacity level established last week.

Pig Iron

Consumers are well covered for early third quarter requirements and are displaying little or no interest in additional commitments. Sellers look for no sizable pickup in inquiry until August, at which time melters will be forced to cover their needs for the remainder of the quarter, and, in addition, seek some measure of protection against any possible price revision for the last quarter.

Plates

Mill backlogs have fallen off slightly, reflecting a sharp reduction in new inquiry over the past week. Nonetheless, it is still difficult to obtain sheared plates in less than five weeks and universal plates in less than four weeks. Several large inquiries are making the rounds in this territory, although some mills are not bidding on these tonnages because of the long con-

tract period. Local shipyards are figuring on two tankers for Sinclair Navigation Co., each requiring 5000 tons of hull plates, and bids are being prepared to cover the 16,000 or more tons of steel required for two battleships. In addition, the Government is taking tenders on June 22 for 2200 tons of plates for delivery to various Navy yards. The Norfolk & Western Railroad is sending out inquiries from Roanoke, Va., on a sizable repair and new construction program, said to include 20 steel cabooses, 10 hopper cars, repairs to 1500 gondola cars, and possible construction of 10 locomotives in company shops. The Reading Railroad has divided 650 underframes between two shops, for delivery as soon as possible. These underframes will require close to 2000 tons of plates.

Sheets and Strip

The Reading Railroad has completed plans for the building of 600 new box cars, 50 flat cars and the conversion of 50 old hopper cars into cement cars. The 600 new cars will require about 2200 tons of 12-gage sheets for the sides, 13-gage roof sheets and 3/16-in. end sheets. Orders for this material are now being distributed among five or six mills, with several Eastern makers receiving the bulk of the tonnage.

New inquiry for sheets here is almost non-existent. Consequently order books are being straightened out and the delivery situation is showing some improvement. During the week, promises on cold rolled sheets, 15 gage and heavier, have narrowed by almost two weeks, and on hot rolled sheets, 16 gage and heavier, have shown a like drop. Tin plate and light hot rolled sheets are still booked very heavily, but hot rolled strip may be obtained almost promptly. Cold rolled strip, however, is still most difficult

to obtain within a reasonable length of time.

Wire Products

New business is almost at a standstill, and the delivery situation shows considerable improvement. The Pennsylvania Railroad is in the market each week for moderate quantities of wire specialties for the Paoli to Harrisburg electrification program.

Shapes and Reinforcing

The market is concerned with a scattering of small industrial projects and several large jobs, with the total tonnage involved not very impressive. At Baltimore, the Kaufman Construction Co. has awarded 3200 tons of shapes to American Bridge Co. and 700 tons of bars to American Steel Engineering Co. for the Howard Street bridge, and at Weissport, Pa., Bethlehem Steel Co. has secured 1800 tons of shapes for a bridge. Bethlehem also has been awarded 800 tons of shapes and 1600 tons of bars for a Philadelphia school at 67th Street and Elmwood Avenue. The only sizable jobs now active are a court house in Philadelphia, on which bids have been postponed until June 29, and a Government building at Washington.

Imports

The following iron and steel imports were received here during the past week: 4552 tons of chrome ore from South Africa; 100 tons of pig iron from British India; 12 tons of steel bands, 34 tons of steel bars and 124 tons of structural shapes from Belgium.



... CINCINNATI ...

... Rush demand for sheets in fair volume.

... Foundries busy but new castings orders decline.

CINCINNATI, June 8.—The sudden appearance of emergency demand for sheets the past week kept the total volume above 75 per cent of capacity despite the holiday. Automotive users were heaviest buyers. Early production on 1938 models and unexpected needs for finishing runs on 1937 automobiles accounted for the rush demand. Labor disturbances in other areas tended to shift buyers

into this district, although demand had virtually no scare appearance. The shift was largely a conservative tendency to try a few new sources in the event customary producers became handicapped too long. The leading district interest reports about two months advanced bookings on hot rolled annealed and galvanized sheets. The cold rolling mill at the Middletown unit is scheduled for two weeks while Butler is booked 30 days ahead and Ashland three weeks. Other mills are in comparable position so far as future production is concerned.

The pig iron market is without change. While shipments on previous commitments are steady, new business is in small and infrequent quantities. With prices reaffirmed for third quarter, forward buying is in small volume. Foundries continue at peak operations and backlogs are being reduced. New orders for castings are not encouraging.



....ST. LOUIS....

...Steel business almost at a standstill.

o o o

...No cancellations, however, because of strikes.

ST. LOUIS, June 8.—Steel business is almost at a standstill because of the strikes in steel mills in other centers. Despite the desire for deliveries, no cancellations are being received. So far there has been no call on warehouses for material as a result of the strikes. As a matter of fact, there has been a slight falling off in warehouse buying during the last few weeks. However, warehouse business for May was said to be between 50 and 75 per cent ahead of the same month last year, with sheets as the principal item in demand. Business with the fabricators of structural steel continues light, and the plants are said to be operating between 40 and 50 per cent of capacity.

Only a fair amount of buying of pig iron followed the opening of order books for third quarter, the prices for which are the same as for this quarter. Not a great amount of business was expected by makers, in view of previous heavy commitments. With the settlement of strikes in the electrical manufacturing field in St. Louis has come a marked increase in operations of jobbing foundries

catering to these lines, and it is expected their business will be heavy during the next few months.

Ingot operations in the St. Louis area continue at 90 per cent of capacity.



..GREAT BRITAIN..

...Demand for pig iron is unabated.

o o o

...Steel export sales are increasing.

LONDON, June 8 (By Cable).—The demand for pig iron is unabated. The Cleveland furnaces are operating at the limit of capacity. Home prices for the second half of the year on foundry and forge have been raised 20s. No. 3 is now 101s. delivered Cleveland zone. The hematite demand is strong and export sales have been made at high prices. Deliveries are in arrears, and new business is accepted only for far forward delivery.

Steel exports sales are increasing, but the semi-finished steel shortage is still acute despite increased Continental imports.

Shipyards are concerned at the rising tendency of steel. New tonnage now costing about 50 per cent over 18 months ago and it is feared that the demand may be diminished in the near future.

Continental steel is quieter, but works are heavily sold out. Continental iron and steel bookings for May amounted to 135,000 tons, of which 48,000 tons was for export.

The Thin Sheet Cartel meets at Heidelberg on June 8 and 9. Price adjustments on 11 and 14 gage are expected.

Tin plate activity is increasing, but the works are hampered by the shortage of tin plate bars. Bar makers are as yet unable to quote for second half delivery owing to rising costs.

The first consignments of American machinery for the new Ebbw Vale continuous strip mill have arrived.

Poland has reduced its import duty on pig iron by 95 per cent.

Manufacturers of Irish wire products have formed a capital of £75,000 to manufacture wood screws, wire, nails, rivets at Limerick.

There are no further changes in British and Continental prices.



REINFORCING STEEL

... Awards of 7300 tons —9700 tons in new projects.

AWARDS

White River Junction, Vt., 300 tons, additional buildings for Veterans' hospital, to Concrete Steel Co.

Jordan, N. Y., 100 tons, New York Central bridge, to Joseph T. Ryerson & Son, Inc.

Philadelphia, 1600 tons, school at 67th Street and Elmwood Avenue, to Bethlehem Steel Corp.

St. Louis, 590 tons, armory, to Joseph T. Ryerson & Son, Inc.

Hastings, Neb., 4700 tons, Central Nebraska Power and Irrigation District dam project, to Sheffield Steel Corp.

NEW REINFORCING BAR PROJECTS

Belchertown, Mass., 150 tons, administration building for dam project.

New York, 1175 tons, New Jersey approach, Lincoln tunnel, Port of New York Authority, contract MHT-23; bids close June 15.

Cabin John, Md., 5000 tons, model naval testing plant, near Cabin John.

Washington, 1200 tons, Government printing plant.

Buffalo, 600 tons, sewage disposal plant; bids to be taken June 22.

Cincinnati, 224 tons, Laurel Hills housing project; bids taken June 4.

Berea, Ky., 150 tons, two buildings for Berea College.

Pekin, Ill., 200 tons, building for Standard Brands, Inc.

State of Illinois, 194 tons, highway work; bids taken.

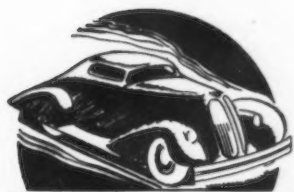
State of Wisconsin, 225 tons, substructure of bridge No. 300, Mississippi River at La Crosse, Wis.; Minneapolis Bridge Co., low bidder at \$288,446 on bids opened June 4, postponed from May 28.

Manhattan, Kan., 400 tons, Kansas State College building.

Seattle, 150 tons, Ruby Dam project; bids about July 1.

The Principles of Metallic Corrosion

D. R. U. R. EVANS' recent papers on metallic corrosion, excerpts from which were compiled in an article, "The Principles of Metallic Corrosion," in THE IRON AGE, issues of April 15 and 22, were presented before the Institute of Engineers and Shipbuilders in Scotland and the Birmingham Metallurgical Society. The originals of these papers may be examined in the transactions of the institute, 1936-37, vol. 80, page 276.



... CLEVELAND ...

... Ingot output unchanged at Youngstown, but rises slightly in Cleveland-Lorain.

□ □ □

... New business in steel continues to taper off, but backlogs are still large.

□ □ □

... Consumers not being inconvenienced to any extent yet by strikes.

CLEVELAND, June 8.—With no change in the rate of operations of northern Ohio steel plants affected by strikes, ingot output in the Youngstown district remains at 45 per cent of capacity and in the Cleveland-Lorain district the rate gained one point to 56 per cent of capacity.

New business in finished steel continues to taper off moderately, indicating the usual seasonal lull in the demand from some consuming industries and also the slowing down in the demand from the motor car manufacturers. New orders for sheets for new motor car models are still reaching the mills, but these are for small lots. With few model changes this year, the changeover from the old to the new models is expected to be accomplished more rapidly than in previous years.

Little steel tonnage has been diverted to other sources of supply because of the strikes now in effect. While some new orders have come from buyers in early need of steel which they are unable to secure at present from strike-ridden plants, these generally have been for small fill-in lots, indicating that consumers still have ample stocks and so far have not been seriously inconvenienced by the strikes.

Consuming plants are maintaining good operations, but as a rule have fair stocks and are not showing the interest in forward buying that they did early in the spring. Should present labor troubles in the steel plants continue for two or three weeks, it is expected that

many consumers will have to look for new sources of supply.

Activity in the construction field is very light and confined mostly to private work. New demand coming from the railroads is light. Little rail tonnage is expected to be placed here during the remainder of the year, although there seems to be a possibility that the Chesapeake & Ohio may make a rail purchase late in the year.

Pig Iron

Although strikes have tied up deliveries by some furnaces, little if any business has been diverted to other sources. Most consumers took in sufficient iron before labor troubles set in to tide them over the next month or so. With prices reaffirmed for third quarter, consumers are now buying for that delivery only in limited amounts. Indications are that third-quarter business will be spread out rather evenly over coming months.

Sheets

The demand has continued to decline, the spurt in new business that has come from motor car manufacturers for material for new models not being sufficient to offset the falling off in miscellaneous tonnage. While some consumers have diverted to other producers specifications that they had with mills that are closed down by strikes, these have been only for small fill-in lots. Makers of refrigerators, stoves and other household equipment continue to maintain good operations. However, these plants have good stocks as well as considerable tonnage on

order so that they are buying little steel at present. Deliveries are extended until August or later on wide cold-rolled and galvanized sheets, but orders for other grades can be placed for July shipment. Demand for stainless steel sheets continues very active and some of the mills have extended their delivery promises to three or four weeks.

Strip Steel

With improvement in mill deliveries and a slowing down in automobile production, pressure for shipments by some of the larger consumers in the motor car field has disappeared. These still have outstanding orders for considerable tonnage and are not making new purchases. New business from other sources is light. Consumers are not showing the anxiety to cover for extended future deliveries that they did a few weeks ago.

Bars, Plates and Shapes

Demand for merchant bars has become quite light. Forge shops doing automotive work are slowing down operations as they are finishing up orders for forgings for 1937 models. Many consumers still have fair inventories and are not replenishing stocks. Deliveries seem to show little change, the best delivery promise being about four weeks. Demand for alloy bars has improved. Activity in the construction field continues light, although there is a fair volume of small industrial work. The only sizable job pending is the Industrial Rayon plant at Painesville requiring approximately 4000 tons of structural shapes and reinforcing bars, for which bids will be taken June 17. Public work is scarce. Mills are making little reduction in their heavy backlogs of plate orders.



... BUFFALO ...

... Third quarter pig iron buying fairly good.

BUFFALO, June 8.—Opening of pig iron books for third quarter at no change in prices brought out considerable buying. There has been some good placement of tonnage, large and small, though the buying movement was somewhat modified by the inventories which many melters carried over. Producers' stocks are very low, and

they will relish the opportunity of rounding out some of their grades.

One thousand tons of structural steel for the new Harrison Radiator division plant of General Motors at Lockport, N. Y., will be fabricated by a Buffalo concern. Bids went in yesterday at Detroit on the other contracts in connection with the job. Bids likewise went in yesterday on the contracts outside of the structural steel, for the new General Motors subsidiary in Buffalo,—the Chevrolet plant, which will require 500 tons of steel bars.

Bids will go in June 15 for the D. & H. grade crossing job at Cobleskill, N. Y., involving 750 tons of structural. Another sizable structural letting will be the 400-ton Ontario Street grade crossing in Buffalo of the New York Central.

The Baker Homes, a Federal housing job in Lackawanna, N. Y., will require a tonnage of bars, as yet undetermined. This general contract was to be bid today.

While the market for warehouse steel is spotty, the month of May was good. Bars, structurals and plates are declining in demand, but sheets have maintained their position well and alloys and stainless steels are in good demand.



... Government to spend \$14,000,000 for armament.

... High level of industrial activity continues.

TORONTO, June 8.—Indications of further stimulus to activity in Canadian iron and steel operations are revealed in the announcement that the Canadian Government has placed contracts amounting to \$14,000,000 for military, naval and air equipment. While details have not been made public, it is stated that some \$10,000,000 will be expended in Canada and largely for air force equipment. These new orders will stimulate activities in the steel industry and further increase backlogs which are at the highest level in several years. Additional orders for iron and steel are expected from Great Britain. In the meantime Canadian plants are engaged on railroad and equipment orders placed early in

the year and it now appears that capacity operations may be carried well into 1938. Industrial demand for iron and steel is holding a good level. Local steel interests do not look for further changes in prices in the immediate future.

Melters continue to show keen interest in the pig iron market, and orders for iron may stay at a high level until there has been a change in the scrap situation and melters are able to obtain larger tonnages of cast and other iron grades.

Colorado Fuel Buys California Plant

THE Colorado Fuel & Iron Co., Denver, has taken over substantially all of the assets of the California Wire Cloth Co., Oakland, Cal., in exchange for 10,495 shares of the former's stock, application to list and register which is now being made.

Operations will be conducted by a wholly-owned subsidiary of the Colorado company, and no interruption of operations is anticipated. It is expected that the California plants will be improved and modernized, and production increased. At present the company has annual capacity of 3000 tons of plain wire.

Illinois Judge Enjoins Labor Board

CHICAGO, June 8.—Charging that the National Labor Relations Board was interfering with his court by summoning witnesses away from his courtroom, Theodore Forby, Zion, Ill., judge of the Lake County Circuit Court, before whom is being heard contempt proceedings against 92 men charged with violating a court order in last February's sitdown strike at the plant of the Fansteel Metallurgical Corp., North Chicago, yesterday issued an injunction halting the Labor Board's trial of the company on charges of Wagner Act violation.

Judge Forby stated that anyone interfering with his court will be cited for contempt and may go to jail.

Meyer Adelman, and Oakley Mills, CIO organizers, and 37 Fansteel strikers were convicted today of contempt of court for defying a court order during a sitdown strike at the Fansteel plant last February. Sentences ranged from \$1,000 fine and 240 days in jail for Adelman to \$100 and 10 days in jail for some of the strikers. Bail was refused.



... Business in light volume, but backlogs are still large.

SAN FRANCISCO, June 7.—Aggregate awards last week were light, with practically no reinforcing awards of over 100 tons and only one sizable structural letting. Judson Pacific Co. was awarded 850 tons of shapes called for in the central tower for the Golden Gate Bridge Exposition on Yerba Buena Island in San Francisco Bay. Judson Pacific was also low on earlier bids for the same project. Herick Iron Works took 250 tons of structural steel for a new hospital at Stockton, Cal.

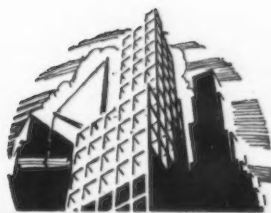
Bids will be opened by San Francisco June 14 on 835 tons of cast iron pipe to be used in various city jobs. At Seattle bids are expected about July 1 on the Ruby Dam project, involving some 300 tons of shapes and 150 tons of bars. Total cost of this dam across Skagit River will exceed \$4,000,000. Saford, Ariz., will open bids in about two weeks on 21 miles of 10-in. steel pipe for a water supply system. Again bid opening has been postponed on 1800 tons of bars for Sunset Reservoir in San Francisco, this time from June 1 until July 8.

Labor difficulties have not as yet had any effect on Pacific Coast steel business.

Business, though seasonally light, is fairly active. Backlogs are still large.

Weirton Steel Adds To Ingot Capacity

AN increase of 10 per cent in the total ingot capacity of the Weirton Steel Co. has resulted from operation of a large-type bessemer converter recently installed at the main plant at Weirton, W. Va., it is announced by T. E. Millsop, president. The converter is an important addition to the Weirton company's steel producing equipment, which has been operated at capacity for months, and will speed the flow of metal to rolling mill departments.



...NEW YORK...

... Not much steel business diverted to other companies as result of strikes.

... Downward trend in new business has not been halted by curtailment of supply.

... Bids being taken for Lincoln tunnel and Whitestone-Bronx bridge.

NEW YORK, June 8.—A surprisingly small amount of business has been diverted to other steel companies as a direct result of the strikes at plants of three major companies. Some companies whose plants are unaffected by labor troubles have had only one or two instances in this territory to indicate that customers of the affected plants are worried over steel deliveries from those plants. There are two logical conclusions: one is that buyers have larger stocks in their warehouses or on the way than has generally been realized, and the other is that steel users are fairly optimistic that the strikes will not last long enough to cripple their own operations, and therefore they will await deliveries from their regular sources if that doesn't take too long.

As a matter of fact, the strikes have not as yet halted the recent downward trend in new business. While some companies did a fairly large business in this territory in May, particularly in the heavy products, the volume thus far in June is falling below the May rate. Some mills have open spaces on their schedules within the next few weeks, and their delivery promises have eased considerably.

The Breeze Corp., Newark, N. J., has the contract for steel shelving for the Library of Congress Annex, Washington, which will take 9500 tons of sheets. Bids will be taken up to June 15 for material for the New Jersey approach to the Lincoln Tunnel (New York Port Authority contract No. MHT-23), including 1900 tons of fabricated

structural steel, 610 tons of silicon steel, 1175 tons of reinforcing bars and 20 tons of cast iron pipe and fittings. Another job that will take a large tonnage of steel over a long period is the new Whitestone-Bronx bridge. Bids will be taken by the Triborough Bridge Authority up to June 23 on contract WB-3, which calls for 6800 tons of fabricated steel towers; for the same job bids were closed today (June 8) on 1020 tons of structural steel. The Whitestone-Bronx bridge will provide a new traffic route to the New York World's Fair.

Pig Iron

Chief concern of furnaces at present is to ship iron so as to clear the books of as much second quar-

ter iron as possible before the end of the month. While there has obviously been no rush for foundries to cover themselves on third quarter requirements, furnaces report a good volume of normally expected business from regular customers. One furnace is already booked to Oct. 1. Export inquiries continue in good volume in tonnages ranging from 500 to 1000, and closures are being regularly made.

Plates and Sheets

New and contemplated railroad business features the plate market. Bethlehem received an order last week for the construction of underframes for 650 Norfolk & Western box cars, and 50 hopper cars are to be fabricated by the American Car & Foundry Co. for the same road. The Norfolk & Western also has a repair program involving 1350 cars, and is to buy 10 new locomotives, 20 hopper cars and 30 cabooses. On June 10, the Sinclair Refining Co. is to open bids on two tankers, taking several thousand tons of steel each. Bids on the United States Line ship are to be readvertised. Despite all this future work involving plates and sheets, immediate orders are declining at an accelerated rate. There has been a small amount of shifting of specifications as a result of strikes, one instance being on stainless sheets.

Wire

Openings are occurring on mill schedules and new business is being actively solicited, but as a result of this sales effort, the volume of orders is being maintained. Common wire is now obtainable on fairly prompt delivery. Light strip of narrow width is obtainable in three to four weeks.



...BOSTON...

... Pig iron exports a market strengthening factor.

BOSTON, June 8.—Furnaces are booking small tonnages of pig iron for third quarter delivery and occasionally a fill-in lot for prompt shipment. Indications are, based on foundry talk, that buying will shortly become more brisk. Owing to increasing exports the price situation is extremely strong. Within 10 days 3046 tons was

shipped to Germany, 500 tons to Holland and 25 tons to England, a total of 3571 tons. Japan already has contracts for a sizable tonnage, and Italy recently placed business. In addition, Czechoslovakia, Greece, Sweden and Poland have sounded out this market. Thus 9 foreign countries are interested in domestic pig iron.

Strikes in automobile and steel plants have not hurt business in New England to any appreciable extent. There is more or less labor unrest in all New England States, but in industries having but remote influence on steel and allied lines. Despite the unrest, a gain in general business activity is under way once more. Owing to the sizable amount of repair work and small construction, steel warehouses report a very satisfactory outgo.



...NON-FERROUS...

... Copper listless as prices drop in Europe.

o o o

... Zinc sales last week surprisingly high.

NEW YORK, June 8.—Troubled by the unsettled conditions in Europe and the lethargy of American buyers, the traders in electrolytic copper abroad are showing no inclination to take on additional commitments of metal, at least at prices higher than those prevailing here. The result has been that foreign metal has drifted steadily downward during the week, with more than one sizable lot crossing the counter today at price levels

ranging from 13.90c. to 14c. a lb., c.i.f. usual Continental base ports. In this country, most large users of copper have detected a definite slowing up in the industrial tempo and consequently are not anxious to take on additional fall commitments. The result has been a listless market, with only 5066 tons of metal sold so far this month, mostly for August and September delivery. Despite this disinterest the spot position of the metal is still ex-

tremely tight, and reports have it that several consumers have been forced to pay premiums on small lots for immediate delivery. The domestic price continues to be firm at 14c., delivered Connecticut Valley.

Zinc

On the surface, the spelter market last week was apparently very quiet, but actual sales totals for the period were surprisingly high, amounting to 4632 tons of prime Western and 350 tons of brass special. Shipments during the week totaled 3562 tons. Total undelivered orders at the end of May were 67,100 tons, the lowest total reported since last October, and total stocks at the same time amounted to 13,774 tons, which indicates a very tight position for the metal. Producers are stepping up production, however, and the stock of metal will probably increase to a more comfortable level over the next several months. Steel strikes have held up galvanizing operations in several instances, and, currently no mill is showing much interest in obtaining new supplies. The price is nonetheless very steady at 6.75c. a lb., East St. Louis, and sellers look for no change within the immediate future.

Tin

Buyers are treading gingerly until the outcome of the steel strikes can be determined; consequently the tin market continues inactive with Straits metal available in New York today at 56.00c., which is 25 points under the prevailing price a week earlier. It is difficult to accurately evaluate the full effect of the strikes on tin demand, but it is probably true that the three struck steel plants are using 600 tons of tin less per month. The settling of the German-Spanish situation and the removal of the excess profits tax has had a steady effect upon the London market, with prompt metal being quoted on first call today at £251, and three months metal at £249 15d.

Lead

June requirements are two-thirds covered, and July is one-third sold. Considerable metal is yet to be bought and the market continues quiet and firm at 6c. a lb., New York. Consumption, which is averaging in the neighborhood of 50,000 tons monthly, is still ahead of production, and it is still necessary to eat into stocks. Inquiries have tapered somewhat, although buying still continues at what might be termed a satisfactory rate. London metal was quoted today at 5.25c., with increasing buying interest evidenced on the part of importers.

The Week's Prices. Cents Per Pound for Early Delivery

	June 3	June 4	June 5	June 7	June 8
Electrolytic copper, Conn.*....	14.00	14.00	14.00	14.00	14.00
Lake copper, N. Y.	14.12 1/2	14.12 1/2	14.12 1/2	14.12 1/2	14.12 1/2
Straits tin, spot, New York....	56.00	56.125	56.125	56.125	56.00
Zinc, East St. Louis.....	6.75	6.75	6.75	6.75	6.75
Zinc, New York.....	7.10	7.10	7.10	7.10	7.10
Lead, St. Louis.....	5.85	5.85	5.85	5.85	5.85
Lead, New York.....	6.00	6.00	6.00	6.00	6.00

*Delivered Connecticut Valley; price 1/4c. lower delivered in New York.

†Noon Price.

Aluminum, virgin 99 per cent plus 20.00c.-21.00c. a lb., delivered.

Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.

Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.

Antimony, Asiatic, 14.75c. a lb., prompt, f.o.b., New York.

Quicksilver, \$96.00 to \$98.00 per flask of 76 lb.

Brass ingots, commercial 85-5-5-5, 14.50c. a lb. delivered; in Middle West 1/4c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.	
Tin, Straits pig....	56.00c. to 57.00c.
Tin, bar	59.25c. to 60.25c.
Copper, Lake	15.00c. to 16.00c.
Copper, electrolytic....	15.00c. to 16.00c.
Copper, castings	14.75c. to 15.75c.
*Copper sheets, hot-rolled	21.62 1/2c.
*High brass sheets....	19.50c.
*Seamless brass tubes	22.25c.
*Seamless copper tubes	22.37 1/2c.
*Brass rods	16.00c.
Zinc, slabs	8.00c. to 9.00c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	13.75c.
Lead, American pig. 7.00c. to 8.00c.	
Lead, bar	8.00c. to 9.00c.
Lead, sheets, cut....	10.50c.
Antimony, Asiatic ..	14.50c.
Alum., virgin, 99 per cent plus	24.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	19.50c. to 21.00c.
Solder, 1/2 and 1/2	36.50c. to 38.50c.
Babbitt metal, commercial grade	25.00c. to 65.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 3 1/2 per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent

From Cleveland Warehouse

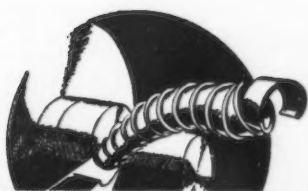
Delivered Prices per Lb.	
Tin, Straits pig.....	60.375c.

Tin, bar	62.375c.
Copper, Lake	15.00c. to 15.25c.
Copper, electro-lytic	15.00c. to 15.25c.
Copper, castings	14.75c. to 15.00c.
Zinc, slabs	8.75c. to 9.00c.
Lead, American pig. 6.50c. to 6.75c.	
Lead, bar	10.00c.
Antimony, Asiatic	16.50c.
Babbitt metal, medium grade.....	23.25c.
Babbitt metal, high grade.....	64.375c.
Solder, 1/2 and 1/2	38.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	11.125c.	11.875c.
Copper, hvy. and wire	10.50c.	11.00c.
Copper, light and bottoms	9.50c.	9.75c.
Brass, heavy	6.25c.	6.875c.
Brass, light	5.00c.	5.75c.
Hvy. machine composition	9.37 1/2c.	9.87 1/2c.
No. 1 yel. brass turnings	7.37 1/2c.	7.87 1/2c.
No. 1 red brass or compos. turnings	9.00c.	9.50c.
Lead, heavy	4.75c.	5.12 1/2c.
Cast aluminum ..	12.12 1/2c.	13.25c.
Sheet aluminum ..	13.25c.	14.75c.
Zinc	3.75c.	4.12 1/2c.



THIS WEEK'S MACHINE ... TOOL ACTIVITIES ...

... *International Harvester purposes to spend \$4,000,000 on a truck engine plant at Indianapolis.*

o o o

... *Automotive and aviation interests still the chief factors in the market.*

o o o

... *Deliveries are improving in some lines, though still considerably extended.*

Chicago

THE attention of all tool sellers is centered on the proposed \$4,000,000 International Harvester plant at Indianapolis, where about 700 truck engines are to be turned out daily. All new equipment will be purchased for this expansion, it is understood. No other industrial buying on any scale has been reported, and the railroads are quiet. May sales in most offices were behind April, but sales representatives regard this as a good sign, since it is more nearly normal. Inquiries are coming in at about the same rate as last week, although one spokesman stated that quotations are much fewer. Demand is unceasing for good used tools, but the supply is extremely limited. Small tools continue in good demand. Deliveries of all sizes and classifications of machine tools are generally improved, but buyers still are faced with the problem of unusually extended deliveries. Strikes and indecision in Washington continue the main factors, most sellers believe, in the current slackening in demand.

Pittsburgh

INQUIRIES are not any better than a week ago and are off considerably from the volume received several weeks ago. Labor troubles are still exerting their influence and even companies not affected by disturbances seem to be developing a cautious attitude. Orders are off a little from last week, and shipments to strikebound plants have been held up. It is hoped by some machine tool manufacturers that the current quiet period will allow them to make improvements in

the delivery situation. On the other hand, however, when labor peace is finally realized, the pressure for held-up shipments will probably be intense. Most machine tool manufacturers who have been receiving their material from steel plants affected by strikes have a fair amount of supplies on hand, and if the tie-ups do not last too long there is little chance of embarrassment.

Cincinnati

THE machine tool market is spotty. Average business the past week was a trifle under the preceding week, but the recession will afford some opportunity to catch up with backlogs. Labor disturbances in other areas combined with consumer relaxation in the warm weather are probably leading factors in the present slackening. Interest in tools, however, is steadily being maintained by way of inquiry. Automobile and aviation interests maintain steady ordering of millers, grinders, lathes and broaching machinery. Other demand is scattered. Engine and automatic lathes are most active, crankshaft types being dull. One order was from a leading manufacturer of low-priced cars.

Factory operations are still high, since delivery requirements are prompt.

New York

AFTER closing a better-than-expected month as far as new orders are concerned, dealers and factory representatives are finding no let-up in either inquiries or orders. Practically all the representative companies are in the market at this time,

including such well-known firms as General Electric, American Locomotive, American Car & Foundry, and the Aluminum Co. of America. The railroad equipment firms are all busy on present programs and anticipate future commitments on the part of the carriers. Aircraft firms are active. Wright Aeronautical is adding an assembly building. A sizable amount of comparatively new equipment has been thrown on the second-hand market through the liquidation of the Atwater-Kent Co., Philadelphia. With deliveries on new equipment growing longer, some of this used machinery has been picked up by firms not ordinarily in this market.

Export demand remains strong, and large orders for American equipment have been placed by British interests in recent weeks.

Cleveland

NEW business in machine tools continues to decline in volume, and inquiry is scarce. Orders are mostly for the small-sized machines. The Firestone Steel Products Co., Akron, purchased 10 hydraulic presses and has taken quotations on some other machinery. The Chevrolet Motor Car Co. is reported to have purchased considerable equipment for its Buffalo plant. Labor unrest, particularly the strikes in the plants of three steel companies has caused apprehension in the minds of machinery buyers, and that evidently is causing some holding back of machinery purchases. However, there have been very few cancellations of machines ordered some time ago, deliveries of which buyers cannot secure for several months.

Detroit

A SEASONAL slackening is making itself felt in the automotive industry as most machinery builders concentrate on completing equipment for fall delivery. Chevrolet purchasing for its Tonawanda, N. Y., plant is well along toward completion, but is still the most active factor locally. Ford is buying to increase production in the Lincoln-Zephyr plant, partly to meet demand for cars, partly to avoid third shift of workers. Chrysler's new plant at Kokomo, Ind., has purchased seven Colonial broaching machines and three automatic assembly machines for needle bearings.

Railroad Buying Lower In May

ALTHOUGH railroad equipment orders for May showed a substantial reduction from previous months, the total for the five months of this year, 44,562 cars, is still greater than any corresponding period from 1931 to 1936, according to *Railway Age*.

Equipment orders reported in May totaled 14 locomotives, 3903 freight cars, and 8 passenger-train cars.



IRON AND STEEL SCRAP

... Buyers adopt cautious attitude in face of labor trouble.

o o o

... Chicago steel off \$1; composite reaches new low of \$17.42.

JUNE 8.—Only important center where steel strikes have affected prices appears to be Chicago, where most of the leading grades are off \$1 a ton. With Pittsburgh and Philadelphia prices of No. 1 steel unchanged, THE IRON AGE composite figure is reduced to \$17.42, lowest since Dec. 15, 1936. Prices generally are nominal, in the absence of any real buying, since most mills have adopted a watchful waiting attitude. The belief is held, however, that prices will rise upon settlement of labor disputes.

Export buying has tapered to zero, but heavy shipments are going forward to Japan and Europe. Department of Commerce figures show 989,443 tons of scrap exported the first four months of the year, an increase of 53 per cent over the corresponding period in 1936.

Pittsburgh

Although the local market is dull and inactive, peculiarly enough the only scrap grades affected so far by strike conditions appear to be turnings. Recent railroad sales made at around \$20 a ton or more for heavy melting steel support the assumption that underlying market conditions are still healthy. A continuation of present labor disturbances, however, in other areas, might change the picture somewhat. Meanwhile, both buyers and sellers in this district have adopted a watchful waiting attitude, and coverages on recent \$19 No. 1 steel sales are being made at \$18.50.

Chicago

Nearly all prices are being adjusted downward this week as a result of a stagnant market in which brokers' buying prices are becoming lower and lower. Some No. 1 steel has been bought for shipment to the dock for \$15 delivered, and the report still persists of a mill sale at \$16, but this is unconfirmed. Practically every quotation is nominal, but indications are that material, when sold, will go at less than last week's levels, although an immediate rise following the first

few sales after the ending of the strike would not be surprising.

Philadelphia

The district's scrap yards are somewhat more active as all consumers have removed shipping restrictions. However, new buying continues at low ebb, although the market was given a slight flip by a Pencoyd purchase of No. 2 at \$15.75 and has derived some semblance of steadiness through a revival of scattered inquiry in other directions. Export buying of No. 1 at \$18 has tapered to zero; there is less than a cargo at Port Richmond now, but considerable scrap is earmarked at local yards awaiting boats due later in the month. The Government, instead of discouraging scrap exports, appears to be encouraging such activity. Bids on the 28 Maritime Commission boats, closed on May 27, have been tossed out, and new bids called for July 8. Foreign countries will be permitted to bid, with the privilege of taking a load of scrap in each boat. Thus, foreign buyers have an opportunity to secure 60,000 tons of scrap with practically no freight charge.

Cleveland

Strikes at some local and Youngstown plants continue to be a restraining factor upon scrap. Shipments in many cases have been stopped altogether. Only a few grades of scrap, however, are lower in price this week, and some dealers are buying for yard stocks in expectation of higher prices when current labor uncertainties are ended. Supplies appear to be coming out less freely. Machine shop turnings have been reduced \$1 a ton, and No. 1 busheling is 50c. lower. In the Youngstown area, all grades have declined. The New York Central list last week brought \$19 for No. 1 steel from a Buffalo purchaser, and \$21.50 for cast iron car wheels from a Columbus, Ohio, consumer.

Boston

Hardly enough material is moving to Pennsylvania to establish prices, and even buying of cast by New England foundries has dropped off perceptibly. Textile machinery cast is

scarcer than it has been in years, but apparently there is an abundance of No. 1 machinery cast. Exporters have not changed prices one iota. Just now Japan is taking the bulk of scrap, the last three shipments to that country aggregating approximately 24,000 tons. Another boat is loading around 7000 tons, and 12 other sizable tonnages are scheduled to leave here this month.

New York

Prices continue nominal in the absence of any real market activity. With the exception of a sale of No. 1 steel to the Trenton, N. J., consumer, mill purchases are insignificant. One dealer indicated, however, that he had turned down a sizable offer at above-the-market price because he foresaw difficulty in picking up the material at a profit. There appears to be a scarcity of railroad scrap, and the unseasonably warm weather since Memorial Day has curtailed collection by pushcart men. No new developments are reported in exports, except that the movement of material to Europe is freer, but there are still large accumulations of scrap awaiting shipment on old orders.

St. Louis

The scrap iron market continues its downward path in St. Louis. Prices are off 25c. to \$1. The weakness is due to a lack of buying by steel mills in the district, who are well supplied with material, plus strikes in other steel centers. There is said to be considerable distress scrap iron as a result of these unfavorable conditions.

Cincinnati

Labor disturbances in other areas are having a depressing effect upon the local market. While bids are unchanged in the absence of test, the trade feels the market to be weaker. Trading is desultory and confined to odd lots for contracts and yard scrap. Distress material is almost negligible.

Detroit

Uncertainty engendered by strikes against steel producers and a threat of strikes in Michigan ore fields has been a factor in further depression felt in the Detroit scrap market. Scattered sales have shown increasing weakness on several items, but heavy melting steel and hydraulic compressed sheets are quoted at last week's levels. Local yard operators with business near standstill are negotiating with UAW committee on wages and shorter work week. Indications point to early settlement.

Buffalo

The market shows strength despite the shutdown of steel mills in the outside districts, but there are no sales and the figures quoted are nominal. Cheap scrap in considerable tonnage has been offered to consumers, but this is largely due to reprisal tactics in a dealers' controversy. One lot of 10,000 tons of No. 1 heavy melting steel was offered at as low as \$16.50, but this is not representative of the market.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$18.50 to \$19.00
Railroad hvy. mltng.	19.75 to 20.25
No. 2 hvy. mltng. steel.	16.50 to 17.00
No. 2 RR. wrought	18.50 to 19.00
Scrap rails	20.50 to 21.00
Rails 3 ft. and under.	25.00 to 25.50
Comp. sheet steel	18.50 to 19.00
Hand bundled sheets.	16.50 to 17.00
Hvy. steel axle turn.	17.00 to 17.50
Machine shop turn.	14.00 to 14.50
Short shov. turn.	14.50 to 15.00
Mixed bor. & turn.	13.75 to 14.25
Cast iron borings	14.00 to 14.50
Cast iron carwheels.	19.00 to 19.50
Hvy. breakable cast.	15.00 to 15.50
No. 1 cupola cast.	19.00 to 19.50
RR. knuckles & cplrs.	24.50 to 25.00
Rail coil & leaf springs	24.50 to 25.00
Rolled steel wheels.	24.50 to 25.00
Low phos. billet crops.	25.50 to 26.00
Low phos. sh. bar	24.50 to 25.00
Low phos. punchings.	22.50 to 23.00
Low phos. plate, hvy.	23.50 to 24.00
Low phos. plate clips.	21.50 to 22.00
Steel car axles	24.50 to 25.00

CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$17.00 to \$17.50
No. 2 hvy. mltng. steel.	16.00 to 16.50
Comp. sheet steel	16.50 to 17.00
Light bund. stampings.	12.50 to 13.00
Drop forge flashings.	15.50 to 16.00
Machine shop turn.	11.00 to 11.50
Short shov. turn.	12.00 to 12.50
No. 1 busheling	15.50 to 16.00
Steel axle turnings.	13.50 to 14.00
Low phos. billet and bloom crops	23.50 to 24.50
Cast iron borings	12.00 to 12.50
Mixed bor. & turn.	12.00 to 12.50
No. 2 busheling	12.00 to 12.50
No. 1 cast.	19.00 to 19.50
Railroad grate bars.	11.50 to 12.00
Stove plate	9.50 to 10.00
Rails under 3 ft.	23.00 to 23.50
Rails for rollings	21.00 to 21.50
Railroad malleable	20.50 to 21.00
Cast iron carwheels.	21.50

PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$17.50 to \$18.00
No. 2 hvy. mltng. steel.	15.50 to 16.00
Hydraulic bund., new.	18.00 to 18.50
Hydraulic bund., old.	14.50 to 15.00
Steel rails for rolling.	21.00 to 21.50
Cast iron carwheels.	19.50 to 20.00
Hvy. breakable cast.	18.00 to 18.50
No. 1 cast.	20.00 to 20.50
Stove plate (steel wks.)	14.00 to 14.50
Railroad malleable	19.00 to 19.50
Machine shop turn.	13.00 to 13.50
No. 1 blast furnace	12.00 to 12.50
Cast borings	12.50 to 13.00
Heavy axle turnings.	15.00 to 15.50
No. 1 low phos. hvy.	23.50 to 24.00
Couplers & knuckles.	23.50 to 24.00
Rolled steel wheels	23.00 to 23.50
Steel axles	25.50 to 26.00
Shafting	23.50 to 24.00
No. 1 RR. wrought	19.50 to 20.00
Spec. iron & steel pipe	16.50 to 17.00
No. 1 forge fire	16.00 to 16.50
Cast borings (chem.).	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:	
Per Gross Ton	
Hvy. mltng. steel.	\$15.50 to \$16.00
Auto. hvy. mltng. steel, alloy free	14.50 to 15.00
No. 2 auto. steel	12.00 to 12.50
Shoveling steel	15.50 to 16.00
Hydraul. comp. sheets.	14.50 to 15.00
Drop forge flashings.	13.50 to 14.00
No. 1 busheling	14.50 to 15.00
Rolled carwheels	19.50 to 20.00
Railroad tires, cut	21.50 to 22.00
Railroad leaf springs.	21.00 to 21.50
Steel coup. & knuckles	19.50 to 20.00
Axle turnings	15.00 to 15.50
Coil springs	22.00 to 22.50
Axle turn. (elec.)	15.50 to 16.00
Low phos. punchings.	20.00 to 20.50
Low phos. plates, 12 in. and under	20.00 to 20.50
Cast iron borings	10.00 to 10.50
Short shov. turnings.	10.50 to 11.00
Machine shop turn.	8.50 to 9.00
Revolving rails	19.50 to 20.00
Steel rails under 3 ft.	19.50 to 20.00
Steel rails under 2 ft.	20.00 to 20.50
Angle bars, steel	19.00 to 19.50
Cast iron carwheels	18.00 to 18.50
Railroad malleable	19.00 to 19.50
Agric. malleable	15.50 to 16.00
Iron car axles	24.50 to 25.00

Per Net Ton	
Steel car axles	\$21.50 to \$22.00
No. 1 RR. wrought	14.50 to 15.50
No. 2 RR. wrought	14.50 to 15.50
No. 2 busheling, old.	8.50 to 9.00
Locomotive tires	18.00 to 18.50
Pipes and flues	13.50 to 14.00
No. 1 machinery cast.	15.00 to 15.50
Clean auto. cast.	14.00 to 14.50
No. 1 railroad cast.	14.00 to 14.50
No. 1 agric. cast.	13.00 to 13.50
Stove plate	10.50 to 11.00
Grate bars	12.00 to 12.50
Brake shoes	11.00 to 11.50

BUFFALO

Per gross ton, f.o.b. consumers' plants:	
No. 1 hvy. mltng. steel.	\$17.00 to \$17.50
No. 2 hvy. mltng. steel.	15.50 to 16.00
Scrap rails	18.50 to 19.00
New hvy. b'ndled sheet	15.50 to 16.00
Old hydraul. bundles	15.00 to 15.50
Drop forge flashings	15.50 to 16.00
No. 1 busheling	15.50 to 16.00
Hvy. axle turnings	13.00 to 13.50
Machine shop turn.	11.00 to 11.50
Knuckles & couplers.	20.00 to 21.00
Coil & leaf springs.	20.00 to 21.00
Rolled steel wheels.	20.00 to 21.00
Low phos. billet crops.	20.50 to 21.00
Shov. turnings	12.00 to 12.50
Mixed bor. & turn.	10.50 to 11.00
Cast iron borings	10.50 to 11.00
Steel car axles	19.50 to 20.00
No. 1 machinery cast.	18.00 to 18.50
No. 1 cupola cast.	17.00 to 17.50
Stove plate	13.50 to 14.00
Steel rails under 3 ft.	20.50 to 21.50
Cast iron carwheels.	16.50 to 17.00
Railroad malleable	18.50 to 19.00
Chemical borings	11.00 to 11.50

BIRMINGHAM

Per gross ton delivered to consumer:	
Hvy. melting steel	\$15.00 to \$17.00
Scrap steel rails	17.00 to 19.00
Short shov. turnings.	9.00 to 10.00
Stove plate	9.00 to 11.00
Steel axles	18.00 to 19.00
Iron axles	16.50 to 18.00
No. 1 RR. wrought.	13.00 to 15.00
Rails for rolling	18.00 to 20.00
No. 1 cast	16.00 to 18.00
Tramcar wheels	16.00 to 18.00

ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:	
Selected hvy. steel.	\$15.50 to \$16.00
No. 1 hvy. melting.	15.50 to 16.00
No. 2 hvy. melting.	13.50 to 14.00
No. 1 locomotive tires.	18.50 to 19.00
Misc. stand.-sec. rails.	16.75 to 17.25
Railroad springs	20.00 to 20.50
Bundled sheets	10.00 to 10.50
No. 2 RR. wrought	15.00 to 15.50
No. 1 busheling	12.00 to 12.50
Cast bor. & turn.	7.50 to 8.00
Rails for rolling	18.00 to 18.50
Machine shop turn.	9.00 to 9.50
Heavy turnings	12.00 to 12.50
Steel car axles	21.50 to 22.00
Iron car axles	22.00 to 22.25
No. 1 RR. wrought	12.00 to 12.50
Steel rails under 3 ft.	18.50 to 19.00
Steel angle bars	17.50 to 18.00
Cast iron carwheels.	18.00 to 18.50
No. 1 machinery cast.	14.00 to 14.50
Railroad mal'able	18.00 to 18.50
No. 1 railroad cast.	14.00 to 14.50
Stove plate	11.50 to 12.00
Agricul. malleable	12.50 to 13.00
Grate bars	12.00 to 12.50
Brake shoes	12.25 to 12.75

CINCINNATI

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$14.25 to \$14.75
No. 2 hvy. mltng. steel.	11.75 to 12.25
Scrap rails for mltng.	17.50 to 18.00
Loose sheet clippings.	10.25 to 10.75
Hydrau. b'ndled sheets.	13.75 to 14.25
Cast iron borings	8.00 to 8.50
Machine shop turn.	8.50 to 9.00
No. 1 busheling	12.50 to 13.00
No. 2 busheling	6.00 to 6.50
Rails for rolling	19.50 to 20.00
No. 1 locomotive tires.	15.50 to 16.00
Short tails	19.50 to 20.00
Cast iron carwheels.	14.50 to 15.00
No. 1 machinery cast.	14.00 to 14.50
No. 1 railroad cast.	14.00 to 14.50
Burnt cast.	9.50 to 10.00
Stove plate	9.50 to 10.00
Agricul. malleable	15.00 to 15.50
Railroad malleable	16.25 to 16.75
Mixed hvy. cast.	12.00 to 12.50

DETROIT

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$14.50 to \$15.00
No. 2 hvy. mltng. steel.	13.50 to 14.00
Borings and turnings.	10.00 to 10.50
Long turnings	9.25 to 9.75
Short shov. turnings.	10.25 to 10.75
No. 1 machinery cast.	15.00 to 15.50
Automotive cast	15.50 to 16.00
Hydraul. comp. sheets.	15.50 to 16.00
Stove plate	9.50 to 10.00
New factory bushel.	14.00 to 14.50
Old No. 2 busheling.	9.50 to 10.00
No. 2 busheling (black fender stock)	11.50 to 12.00
Sheet clippings	10.50 to 11.00
Flashings	13.25 to 13.75
Low phos. plate scrap.	14.50 to 15.00

YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$18.00 to \$18.50
Hydraulic bundles	17.50 to 18.00
Machine shop turn.	12.50 to 13.00

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$14.50 to \$15.00
No. 2 hvy. mltng. steel.	13.50 to 14.00
Hvy. breakable cast.	13.75 to 14.25
No. 1 machinery cast.	15.00 to 15.50
No. 2 cast.	14.00 to 14.50
Stove plate	11.00 to 11.50
Steel car axles	24.50 to 25.50
Shafting	19.00 to 19.50
No. 1 RR. wrought.	17.00 to 17.50
No. 1 wrought long.	16.00 to 16.50
Spec. iron & steel pipe.	12.50 to 13.00
Rails for rolling.	18.50 to 19.00
Clean steel turnings	9.00 to 9.50
Cast borings	9.50 to 10.00
No. 1 blast furnace	9.50 to 10.00
Cast borings (chem.).	12.00 to 12.50
Unprepar. yard scrap.	9.00 to 9.50
Per gross ton, delivered local foundries:	
No. 1 machn. cast.	\$17.50 to \$18.00
No. 1 hvy. cast cupola.	15.00 to 15.50
No. 2 cast	14.50 to 15.00

BOSTON

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$12.30
Scrap rails	13.30
No. 2 steel	12.25
Breakable cast.	13.10
Machine shop turn.	\$9.00 to 9.50
Mixed bor. & turn.	9.00 to 9.50
Bund. skeleton long.	11.75
Shafting	18.00 to 18.50
Cast bor. chemical.	9.50 to 10.25
Per gross ton delivered consumers' yards:	
Textile cast	\$17.00 to \$19.00
No. 1 machine cast.	18.00 to 19.00
Stove plate	10.00 to 10.50

CANADA

Dealers' buying prices at their yards, per gross ton	
Toronto Montreal	
No. 1 hvy. mltng. stl.	\$12.50 \$13.00
No. 2 hvy. mltng. stl.	11.50 12.00
Mixed dealers steel.	11.00 11.75
Scrap pipe	10.00 9.75
Steel turnings	8.00 8.50
Cast borings	9.25 9.50
Machinery cast.	16.00 17.00
Dealers cast.	14.00 15.00
Stove plate	12.00 12.75

EXPORT

Dealers' buying prices per gross ton:	
New York, truck lots, delivered, barges.	
No. 1 hvy. mltng. steel.	\$15.00
No. 2 hvy. mltng. steel.	14.00
No. 2 cast.	13.00
Stove plate	11.00
Boston on cars at Arm's Base or Mystic Wharf	
No. 1 hvy. mltng. steel.	\$16.00
No. 2 hvy. mltng. steel.	15.00
Rails (scrap)	16.00
Philadelphia, delivered alongside boats, Port Richmond	
No. 1 hvy. mltng. steel.	\$17.50 to \$18.00*
No. 2 hvy. mltng. steel.	16.50 to 17.00*
* Nominal.	
New Orleans, f.a.s., Stuyvesant Dock	
No. 1 hvy. mltng. steel.	\$17.50
No. 2 hvy. mltng. steel.	16.50
Los Angeles, on cars or trucks at local piers	
No. 1 hvy. mltng. steel.	\$10.50 to \$11.00
Compressed bundles	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are \$2 a ton higher, and delivered Detroit \$3 higher.

Per Gross Ton	
Rerolling	\$37.00
Forging quality	43.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton	
Open-hearth or Besse-	
mer	\$37.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.	
Grooved, universal and	
sheared	2.10c.

Wire Rods

(No. 5 to 9/32 in.)

Per Gross Ton	
F.o.b. Pittsburgh or Cleveland	\$47.00
F.o.b. Chicago, Youngstown or	
Anderson, Ind.	48.00
F.o.b. Worcester, Mass.	49.00
F.o.b. Birmingham	50.00
F.o.b. San Francisco	56.00
F.o.b. Galveston	53.00
Rods over 9/32 in. to 47/64 in., in-	
clusive, \$5 a ton over base.	

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.	
F.o.b. Pittsburgh	2.45c.
F.o.b. Chicago or Gary	2.50c.
F.o.b. Duluth	2.60c.
Del'd Detroit	2.60c.
F.o.b. Cleveland	2.50c.
F.o.b. Buffalo	2.55c.
Del'd Philadelphia	2.74c.
Del'd New York	2.78c.
F.o.b. Birmingham	2.60c.
F.o.b. cars dock Gulf ports	2.85c.
F.o.b. cars dock Pacific Ports	3.00c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh	2.30c.
F.o.b. Cleveland, Chicago, Gary	
or Moline, Ill.	2.35c.
F.o.b. Buffalo	2.40c.
F.o.b. Birmingham	2.45c.
F.o.b. cars dock Gulf ports	2.70c.
F.o.b. cars dock Pacific ports	2.85c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	2.55c.
F.o.b. Buffalo, Cleveland,	
Youngstown, Chicago, Gary	2.60c.
or Birmingham	2.70c.
Del'd Detroit	2.95c.
F.o.b. cars dock Gulf ports	2.95c.
F.o.b. cars dock Pacific ports	2.95c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	2.40c.
F.o.b. Buffalo, Cleveland,	
Youngstown, Chicago, Gary	2.45c.
or Birmingham	2.80c.
F.o.b. cars dock Gulf ports	2.80c.
F.o.b. cars dock Pacific ports	2.80c.

Iron

F.o.b. Chicago	2.40c.
F.o.b. Pittsburgh (refined)	3.60c.

Cold Finished Bars and Shafting*

Base per Lb.	
F.o.b. Pittsburgh	2.90c.
F.o.b. Cleveland, Chicago and	
Gary	2.95c.
F.o.b. Buffalo	3.00c.
F.o.b. Detroit	2.95c.

* In quantities of 10,000 to 19,999 lb.

Plates

Base per Lb.	
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago or Gary	2.30c.
Del'd Cleveland	2.435c.
F.o.b. Coatesville or Spar. Pt.	2.35c.
Del'd Philadelphia	2.435c.
Del'd New York	2.53c.
F.o.b. Birmingham	2.40c.

F.o.b. cars dock Gulf ports	2.65c.
F.o.b. cars dock Pacific ports	2.80c.
Wrought iron plates, f.o.b.	
Pittsburgh	3.80c.

Floor Plates

F.o.b. Pittsburgh	3.80c.
F.o.b. Chicago	3.85c.
F.o.b. Coatesville	3.90c.
F.o.b. cars dock Gulf ports	4.20c.
F.o.b. cars dock Pacific ports	4.35c.

Structural Shapes

Base per Lb.	
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago	2.30c.
Del'd Cleveland	2.435c.
F.o.b. Buffalo or Bethlehem	2.35c.
Del'd Philadelphia	2.455c.
Del'd New York	2.5025c.
F.o.b. Birmingham (standard)	2.40c.
F.o.b. cars dock Gulf ports	2.65c.
F.o.b. cars dock Pacific ports	2.80c.

Steel Sheet Piling

Base per Lb.	
F.o.b. Pittsburgh	2.60c.
F.o.b. Chicago or Buffalo	2.70c.
F.o.b. cars dock Gulf or Pacific	
Coast ports	3.05c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than	
60 lb., per gross ton	\$42.50
Angle bars, per 100 lb.	2.80

F.o.b. Basing Points

Light rails (from billets) per	
gross ton	\$43.00
Light rails (from rail steel) per	
gross ton	42.00

Base per Lb.

Spikes	3.15c.
Tie plates, steel	2.30c.
Tie plates, Pacific Coast ports	2.40c.
Track bolts, to steam railroads	4.35c.
Track bolts, to jobbers, all sizes	
(per 100 counts)	

65-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE

TERNE PLATE

Sheets

Hot Rolled

Base per Lb.	
No. 10, f.o.b. Pittsburgh	2.40c.
No. 10, f.o.b. Gary	2.50c.
No. 10, del'd Detroit	2.60c.
No. 10, del'd Philadelphia	2.69c.
No. 10, f.o.b. Granite City	2.60c.
No. 10, f.o.b. Birmingham	2.55c.
No. 10, f.o.b. cars dock Pacific	
ports	2.95c.
No. 10 wrought iron, Pgh.	4.25c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	3.15c.
No. 24, f.o.b. Gary	3.25c.
No. 24, del'd Detroit	3.35c.
No. 24, del'd Philadelphia	3.44c.
No. 24, f.o.b. Granite City	3.35c.
No. 24, f.o.b. Birmingham	3.30c.
No. 24, f.o.b. cars dock Pacific	
ports	3.80c.
No. 24, wrought iron, Pitts-	
burgh	5.15c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	3.10c.
No. 10 gage, f.o.b. Gary	3.20c.
No. 10 gage, f.o.b. Detroit	3.30c.
No. 10 gage, del'd Philadelphia	3.39c.
No. 10, f.o.b. Granite City	3.30c.
No. 10 gage, f.o.b. Birmingham	3.25c.
No. 10 gage, f.o.b. cars dock	
Pacific ports	3.70c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	3.55c.
No. 20 gage, f.o.b. Gary	3.65c.
No. 20 gage, del'd Detroit	3.75c.
No. 20 gage, del'd Philadelphia	3.84c.
No. 20, f.o.b. Granite City	3.75c.
No. 20 gage, f.o.b. Birmingham	3.70c.
No. 20 gage, f.o.b. cars, dock,	
Pacific ports	4.10c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.80c.
No. 24, f.o.b. Gary	3.90c.
No. 24, del'd Philadelphia	4.09c.
No. 24, f.o.b. Granite City	4.00c.

No. 24, f.o.b. Birmingham	3.95c.
No. 24, f.o.b. cars, dock, Pacific	
ports	4.40c.
No. 24, wrought iron, Pitts-	
burgh	6.10c.

Electrical Sheets

(F.o.b. Pittsburgh)

Base per Lb.	
Field grade	3.35c.
Armature	3.70c.
Electrical	4.20c.
Special Motor	5.10c.
Special Dynamo	5.80c.
Transformer	6.30c.
Transformer Special	7.30c.
Transformer Extra Special	7.80c.

Base gage changed from 28 to 24 gage. Gage extras are the same as those applying on hot-rolled, annealed sheets with few exceptions. Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating	
f.o.b. Pittsburgh	4.10c.
F.o.b. Gary	4.20c.
F.o.b. cars, dock, Pacific ports	4.80c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.50c.
No. 20, f.o.b. Gary	3.60c.
No. 20, f.o.b. Granite City	3.70c.
No. 20, f.o.b. cars dock Pacific	
ports	4.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh, per	
lb.	3.30c.
No. 28, Gary	3.40c.
No. 28, f.o.b. Granite City	3.50c.
No. 28, cars dock Pacific ports,	
boxed	4.175c.

Tin Plate

Base per Box	
Standard cokes, f.o.b. Pitts-	
burgh district mill	\$5.35
Standard cokes, f.o.b. Gary	5.45
Standard coke, f.o.b. Granite	
City	5.55

Above quotations practically the equivalent of previous quotations owing to new method of quoting, effective Jan. 1, 1937.

Special Coated Manufacturing Ternes

Base per Box	
F.o.b. Pittsburgh	\$4.65
F.o.b. Gary	\$4.75
F.o.b. Granite City	4.85

* Customary 7½ per cent discount in effect through 1936 discontinued as of Jan. 1, 1937.

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)	
8-lb. coating I.C.	\$11.00
15-lb. coating I.C.	13.00
20-lb. coating I.C.	14.00
25-lb. coating I.C.	15.00
30-lb. coating I.C.	16.25
40-lb. coating I.C.	18.50

Hot-Holled Hoops, Bands, Strip and Flats under ¼ in.

Base per Lb.	
All widths up to 24 in., Pitts-	
burgh	2.40c.
All widths up to 24 in., Chicago	2.50c.
All widths up to 24 in., del'd	
Detroit	2.60c.
All widths up to 24 in., Granite	
City	2.60c.
All widths up to 24 in.,	
Birmingham	2.55c.
Cooperage stock, Pittsburgh	2.50c.
Cooperage stock, Chicago	2.60c.

Cold-Rolled Strip*

Base per Lb.	
F.o.b. Pittsburgh	3.20c.
F.o.b. Cleveland	3.20c.
Del'd Chicago	3.48c.
F.o.b. Worcester	3.40c.

* Carbon 0.25 and less.

Cold Rolled Spring Steel

Pittsburgh	
and	
Cleveland Worcester	
Carbon 0.25-0.50%	3.20c. 3.40c.
Carbon .51-.75	4.45c. 4.65c.
Carbon .76-1.00	6.30c. 6.50c.
Carbon Over 1.00	8.50c. 8.70c.

Fender Stock

No. 14, Pittsb'gh or Cleveland	3.45c.
No. 20, Pittsb'gh or Cleveland	3.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)
To Manufacturing Trade

Per Lb.
Bright wire 2.90c.
Spring wire 3.50c.
Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.

To the Trade
Base per Keg
Standard wire nails \$2.75
Smooth coated nails \$2.75
Cut nails, carloads \$3.60

Base per 100 Lb.
Annealed fence wire \$3.20
Galvanized fence wire 3.60
Polished staples 3.45
Galvanized staples 3.70
Barbed wire, galvanized 3.40
Twisted barbed wire 3.40
Woven wire fence, base column. 74
Single loop bale ties, base col.... 63

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh, except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are \$3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe
Base Discounts, f.o.b. Pittsburgh
District and Lorain, Ohio, Mills
F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld		Wrought Iron	
Steel	Black Galv.	In.	Black Galv.
1/4" 52	31	1/4" & 1/2" 13	+35
1/2" 55	38 1/2	1/2" 20	1 1/2
3/4" 59 1/2	49	3/4" 26	8
1" 62 1/2	53	1" & 1 1/4" 14	
1 to 3 64 1/2	55 1/2	1 1/2" 34	16 1/2
		2" 33 1/2	16

Lap Weld	
2" 57	47 1/2
2 1/2" & 3" 60	50 1/2
3 1/2" to 6" 62	52 1/2
7" & 8" 61	50 1/2
9" & 10" 60 1/2	50
11" & 12" 59 1/2	49

Butt Weld, extra strong, plain ends	
1/4" 50 1/2	36 1/2
1/2" to 3/4" 52 1/2	40 1/2
1" 57 1/2	48 1/2
1 1/2" 61 1/2	52 1/2
1 to 3 63	55

Lap Weld, extra strong, plain ends	
2" 55	46 1/2
2 1/2" & 3" 59	50 1/2
3 1/2" to 6" 62 1/2	54
7" & 8" 61 1/2	51
9" & 10" 60 1/2	50
11" & 12" 59 1/2	49

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base cost.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes
(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Cold Drawn	Hot Rolled
1 in. o.d. 13 B.W.G.	\$ 9.46	\$ 8.41
1 1/4 in. o.d. 13 B.W.G.	11.21	9.96
1 1/2 in. o.d. 13 B.W.G.	12.38	11.00
1 3/4 in. o.d. 13 B.W.G.	14.09	12.51
2 in. o.d. 13 B.W.G.	15.78	14.02
2 1/4 in. o.d. 13 B.W.G.	17.60	15.63
2 1/2 in. o.d. 12 B.W.G.	19.37	17.21
2 3/4 in. o.d. 12 B.W.G.	21.22	18.85
3 in. o.d. 12 B.W.G.	22.49	19.98
3 1/4 in. o.d. 12 B.W.G.	23.60	20.97
3 1/2 in. o.d. 10 B.W.G.	45.19	40.15
3 3/4 in. o.d. 11 B.W.G.	29.79	26.47
4 in. o.d. 10 B.W.G.	36.96	32.83
5 in. o.d. 9 B.W.G.	56.71	50.38
6 in. o.d. 7 B.W.G.	87.07	77.35

Extra for less-carload quantities:
25,000 lb. or ft. to 39,999 lb. or ft. 5 %
12,000 lb. or ft. to 24,999 lb. or ft. 12 1/2 %
6,000 lb. or ft. to 11,999 lb. or ft. 25 %
2,000 lb. or ft. to 5,999 lb. or ft. 35 %
Under 2,000 lb. or ft. 50 %

CAST IRON WATER PIPE

Per Net Ton
*6-in. and larger, del'd Chicago \$55.00
6-in. and larger, del'd New York 53.00
*6-in. and larger, Birmingham 47.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles... 56.00
F.o.b. dock, Seattle..... 56.00
4-in., f.o.b. dock, San Francisco or Los Angeles 59.00
F.o.b. dock, Seattle 59.00

Class "A" and gas pipe, \$3 extra.
4-in. pipe is \$3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$46. Birmingham, and \$54 delivered Chicago; and 4-in. pipe, \$49, Birmingham, and \$58 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List
Machine and carriage bolts:
1/2 in. x 6 in. and smaller. 65 and 5*
Larger and longer up to
1 in. 60 and 10*
1 1/2 in. and larger 60 and 5*
Lag bolts 60 and 10*
Plow bolts, Nos. 1, 2, 3
and 7 65 and 5
Hot pressed nuts, and c.p.c.
and t nuts, square or hex.
blank or tapped:
1/2 in. and smaller 65
9/16 in. to 1 in. inclusive... 60 and 5
1 1/2 in. and larger 60

Jobbers discount on above items, 5 per cent.

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon nuts, U.S.S. and S.A.E.:

1/2 in. and smaller 60 and 10
9/16 in. to 1 in. inclusive... 60 and 5
1 1/2 in. and larger 60
Stove bolts in packages, nuts attached 72 1/2
Stove bolts in packages, with nuts separate 72 1/2 and 5
Stove bolts in bulk 80

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets
(1/2-in. and larger)

Base per 100 Lbs.
F.o.b. Pittsburgh or Cleveland.. \$3.60
F.o.b. Chicago or Birmingham.. 3.70

Small Rivets
(7/16-in. and smaller)

Per Cent Off List
F.o.b. Pittsburgh 65 and 5
F.o.b. Cleveland 65 and 5
F.o.b. Chicago and Birmingham 65 and 5

Cap and Set Screws
(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List
Milled cap screws, 1 in. dia. and smaller 50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller 75
Milled headless set screws, cut thread 1/2 in. and smaller 75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller 60
Upset set screws, cup and oval points 75
Milled studs 65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs
F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, \$60 a gross ton.

Alloy Steel Bars
F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base 3.00c.
Delivered, Detroit 3.15c.

S.A.E. Alloy
Series Differential
Numbers per 100 lb.
200 (1/4% Nickel) \$0.35
2100 (1 1/2% Nickel) 0.75
2300 (3 1/2% Nickel) 1.55

2500 (5% Nickel) \$2.25
3100 Nickel-chromium 0.70
3200 Nickel-chromium 1.35
3300 Nickel-chromium 3.80
3400 Nickel-chromium 3.20
4100 Chromium-molybdenum
(0.15 to 0.25 Molybdenum). 0.55
4100 Chromium-molybdenum
(0.25 to 0.40 Molybdenum). 0.75
4600 Nickel-molybdenum (0.20
to 0.30 Mo, 1.50 to 2.00 Ni). 1.15
5100 Chrome steel (0.60-0.90 Cr.) 0.35
5100 Chrome steel (0.80-1.10 Cr.) 0.45
5100 Chromium spring steel..... 0.15
6100 Chromium-vanadium bar... 1.20
6100 Chromium-vanadium
spring steel 0.85
Chromium-nickel-vanadium ... 1.50
Carbon-vanadium 0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base.

Alloy Cold-Finished Bars
F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.60c. base per lb. Delivered Detroit, 3.75c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel
No. 304 No. 302
Forging billets 21.25c. 20.40c.
Bars 25c. 24c.
Plates 29c. 27c.
Structural shapes . 25c. 24c.
Sheets 36c. 34c.
Hot-rolled strip .. 23.50c. 21.50c.
Cold-rolled strip .. 30c. 28c.
Drawn wire 25c. 24c.

Straight Chrome
No. 410 No. 430 No. 442 No. 446
Bars ..18.50c. 19c. 22.50c. 27.50c.
Plates ..21.50c. 22c. 25.50c. 30.50c.
Sheets. 26.50c. 29c. 32.50c. 36.50c.
Hot strip 17c. 17.50c. 23c. 28c.
Cold stp. 22c. 22.50c. 28.50c. 36.50c.

TOOL STEEL

High speed 67c.
High-carbon-chrome 43c.
Oil-hardening 24c.
Special 22c.
Extra 18c.
Regular 14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c a lb. higher.

British and Continental BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export £20 Nominal

Tin plate, per base box 24s. to 25s.

Steel bars, open-hearth. £11
Beams, open-hearth..... £10 12s. 6d.
Channels, open-hearth... £10 12s. 6d.
Angles, open-hearth £10 12s. 6d.
Black sheets, No. 24
gage £15
Galvanized sheets, No.
24 gage £18 15s.

CONTINENTAL

Per Metric Ton, Gold £,
f.o.b. Continental Ports

Current dollar equivalent is ascertained by multiplying gold pound prices by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas £4 7s. 6d.
Wire rods, No. 5 B.W.G. £5 2s. 6d.
Steel bars, merchant £5
Sheet bars £4 8s. 6d.
Plate 1/4 in. and up £6 7s.
Plate 3/16 in. and 5 mm. £6 13s.
Sheet, 1/4 in. £7 9s. 6d.
Beams, Thomas £4 18s.
Angles (Basic) £4 18s.
Hoops and strip, base £6

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Per Net Ton
Plates	3.70c.
Structural shapes	3.70c.
Soft steel bars and small shapes	3.80c.
Reinforcing steel bars	3.80c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No. 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 10)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$4.48
Spikes, large	1 to 24 kegs 3.90c.
	Per Cent Off List
Track bolts, all sizes, per 100 count	55
Machine bolts, 100 count	**
Carriage bolts, 100 count	**
Nuts, all styles, 100 count	**
Large rivets, base per 100 lb.	\$4.35
Wire, black, soft ann'd, base per 100 lb.	3.45c.
Wire, galv. soft, base per 100 lb.	3.85c.
Common wire nails, per keg	3.00c.
Cement coated nails, per keg	3.00c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

**Prices on application.

CHICAGO Base per Lb.

Plates and structural shapes	3.75c.
Soft steel bars, rounds	3.85c.
Soft steel bars, squares and hexagons	4.00c.
Cold-fin. steel bars:	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	4.10c.
Hot-rolled annealed sheets (No. 24)	4.60c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	4.40c.
Track bolts (keg lots)	5.60c.
Rivets, structural (keg lots)	4.60c.
Rivets, boiler (keg lots)	4.70c.
	Per Cent Off List
Machine bolts	*60
Carriage bolts	*60
Lag screws	*55 and 5
Hot-pressed nuts, sq. tap or blank	*60
Hot-pressed nuts, hex. tap or blank	*60
Hex. head cap screws	60
Cut point set screws	75
Flat head bright wood screws	62 and 20
Spring cotters	45
Stove bolts in full packages	72 1/4
Rd. hd. tank rivets, 7/16 in. and smaller	55
Wrought washers	\$4.00 off list
Black ann'd wire per 100 lb. to mfg. trade (No. 14 and heavier)	\$4.55
Com. wire nails, 15 kegs or more, per keg	\$3.20
Cement c'd nails, 15 kegs or more, per keg	\$3.20

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

NEW YORK

	Base per Lb.
Plates, 1/4 in. and heavier	4.00c.
Structural shapes	3.97c.
Soft steel bars, round	4.12c.
Iron bars, Swed. char-coal	6.50 to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.57c.
Flats and squares	4.57c.
Cold-rolled; strip, soft and quarter hard	3.92c.
Hoops	4.32c.

Bands	4.32c.
Hot-rolled sheets (No. 10)	4.00 to 4.07c.
Hot-rolled ann'd sheets (No. 24*)	4.50 to 4.82c.
Galvanized sheets (No. 24*)	5.00 to 5.72c.
Long terne sheets (No. 24)	5.50 to 6.20c.
Armco iron, galv. (No. 24†)	6.25c.
Toncan iron, galv. (No. 24†)	6.25c.
Galvanneal (No. 24†)	6.60c.
Armco iron, hot-rolled annealed (No. 24†)	5.65c.
Toncan iron, hot-rolled annealed (No. 24†)	5.65c.
Armco iron hot-rolled (No. 10†)	4.60c.
Toncan iron, hot-rolled (No. 10†)	4.60c.
Cold-rolled sheets (No. 20) less than 1000 lbs.	
Standard quality	5.40c.
Deep drawing	6.05c.
Stretcher leveled	6.05c.
SAE, 2300, hot-rolled	7.82c.
SAE, 3100, hot-rolled	6.37c.
SAE, 6100, hot-rolled, annealed	10.52c.
SAE, 2300, cold-rolled	9.00c.
SAE, 3100, cold-rolled, annealed	8.55c.
Floor plate, 1/4 in. and heavier	5.90c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.35c.
Wire, galv. (No. 9)	4.60c.
Tire steel, 1 x 1/2 in. and larger	4.11c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, base per keg	\$3.40

Per Cent Off List

Machine bolts, square head and nut:	
All diameters. Prices on application	
Carriage bolts, cut thread:	
All diameters. Prices on application	

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.
†125 lb. and more.

ST. LOUIS Base per Lb.

Plates and struc. shapes	3.99c.
Bars, soft steel (rounds and flats)	4.09c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.24c.
Cold-fin. rounds, shafting, screw stock	4.54c.
Hot-rolled annealed sheets (No. 24)	4.84c.
Galv. sheets (No. 24*)	5.49c.
Hot-rolled sheets (No. 10)	4.09c.
Black corrug. sheets (No. 24*)	4.89c.
2 galv. corrug. sheets	5.54c.
Structural rivets	4.94c.
Boiler rivets	5.04c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	65

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base Per Lb.
*Plates, 1/4-in. and heavier	3.80c.
*Structural shapes	3.80c.
*Soft steel bars, small shapes, iron bars (except bands)	3.90c.
†Reinforc. steel bars, sq. twisted and deformed	3.21c.
Cold-finished steel bars	4.53c.
*Steel hoops	4.25c.
*Steel bands, No. 12 and 3/16 in. incl.	4.00c.
Spring steel	5.40c.
†Hot-rolled anneal. sheets (No. 24)	4.65c.
†Galvanized sheets (No. 24)	5.30c.
*Hot-rolled annealed sheets (No. 10)	3.90c.
Diam. pat. floor plates, 1/4 in.	5.45c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

†For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.86c.

Soft steel bars	3.75c.
†Reinforc. steel bars	2.60c.
†Cold-finished steel bars	4.30c.
Hot-rolled strip, 6 in. wide and under	4.16c.
Cold-finished strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.66c.
Galvanized sheets (No. 24)	5.31c.
Hot-rolled sheets (No. 10)	3.91c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.91c.
Floor plates, 3/16 in. and heavier	5.76c.
*Black ann'd wire, per 100 lb.	\$3.40
*No. 9 galv. wire, per 100 lb.	3.80
*Com. wire nails, base per keg	2.95

	Per Cent Off List
Machine and carriage bolts, small	65 and 5
Large	60 and 10
Nuts, 100 count	
1/2 in. and smaller	65 and 5
9/16 in. to 1 in.	60 and 10

†Outside delivery 10c. less.

*For 5000 lb. or less.

†Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI Base per Lb.

Plates and struc. shapes	3.95c.
Floor plates	5.85c.
Bars, rounds, flats and angles	4.05c.
Other shapes	4.20c.
Rail steel reinforc. bars	3.75c.
Hoops and bands, 3/16 in. and lighter	4.25c.
Cold-finished bars	4.50c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.60c.
Galv. sheets (No. 24) 3500 lb. or more	\$5.25
Hot-rolled sheets (No. 10)	4.00c.
Small rivets	.55 per cent off list
No. 9 ann'd wire, per 100 lb. (1000 lb. or over)	\$2.88
Com. wire nails, base per keg: Any quantity less than carload	3.04
Cement c'd nails, base 100-lb. keg	3.50
Chain, lin. per 100 lb.	8.35

Net per 100 Ft.

Seamless steel boiler tubes,	
2-in.	\$21.80
4-in.	52.45
Lap-welded steel boiler tubes,	
2-in.	20.73
4-in.	48.41

BUFFALO Base per Lb.

Plates	3.92c.
Struc. shapes	3.80c.
Soft steel bars	3.90c.
Reinforcing bars	3.10c.
Cold-fin. flats and sq.	4.35c.
Rounds and hex.	4.35c.
Cold-rolled strip steel	3.79c.
Hot-rolled annealed sheets (No. 24)	4.80c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.97c.
Galv. sheet (No. 24)	5.45c.
Bands	4.22c.
Hoops	4.22c.
Heavy hot-rolled sheets	3.97c.
Com. wire nails, base per keg (2500-lb lots or under)	\$3.21
Black wire, base per 100 lb. (Over 2500 lb.)	4.55c.

BOSTON Base per Lb.

Channels, angles	4.20c.
Tees and zeos, under 3"	4.45c.
H beams and shapes	4.07c.
Plates — Sheared, tank and univ. mill, 1/4 thick and heavier	4.08c.
Floor plates, diamond pattern	6.03c.
Bar and bar shapes (mild steel)	4.20c.
Bands 3/16 in. thick and No. 12 ga. incl.	4.40 to 5.40
Half rounds, half ovals, ovals and bevels	5.45c.
Tire steel	5.45c.
Cold-rolled strip steel	3.845c.
Cold-finished rounds, squares and hexagons	4.65c.
Cold-finished flats	4.65c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga.	4.50c.
Galvanized steel sheets, No. 24 ga.	5.05c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

Base per Lb.

Soft steel bars	3.94c.
Structural shapes	3.95c.
Plates	3.95c.
Floor plates	5.85c.
Hot-rolled annealed sheets (No. 24)*	4.69c.
Hot-rolled sheets (No. 10)	3.94c.
Galvanized sheets (No. 24)*	5.40c.
Bands and hoops	4.19c.
Cold-finished bars	4.30c.
Cold-rolled strip	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	6.44c.
Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.	

* Under 400 lb., .50c. over base; 400 to 1499 lb., base; 1500 to 3499 lb., base less .10c.; 3500 lb. and over, base less .15c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

Base per Lb.

Plates and structural shapes	3.86c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.96c.
Soft steel bars, squares and hexagons	4.11c.
Hot-rolled strip	4.21c.
Hot-rolled annealed sheets (No. 24)	4.71c.
Galvanized sheets (No. 24)	5.36c.
Cold-finished steel bars	4.41c.
Structural rivets (keg lots)	4.81c.
Boiler rivets, cone head (keg lots)	4.91c.
Track spikes (keg lots)	4.61c.
Track bolts (keg lots)	5.81c.
Black annealed wire (No. 6 to No. 9 incl.)	4.05c.
Com. wire nails and cement coated nails	
1 to 14 kegs	3.25c.

Per Cent Off List

Machine bolts and carriage bolts, 1/2x6 and smaller or shorter 65	
Larger and longer up to 1 in. diam.	60-5
1 1/2 in. and larger	60
Coach and lag screws	60-5
Hot-pressed nuts, sq. and hex. tapped or blank, 1-199 lb.	50
200 lb. and over	
1/2 in. and smaller	65
9/16 to 1 in.	60-5
1 1/8 in. and over	50-10

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

Base per Lb.

Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.55c.
Hot-rolled annealed sheets, No. 24	4.85c.
Galvanized sheets, No. 24	5.50c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

Base per Lb.

Mild steel bars and small shapes	4.00c.
Structural shapes	3.90c.
Reinforcing bars, 5 to 15 tons	3.16c.
Plates	3.90c.
Hot-rolled sheets, No. 10	3.95c.
Bands	4.20c.
Hoops	4.45c.
Special threading steel	4.15c.
Checkered floor plates 1/4 in. and heavier	5.80c.
Galvanized sheets, No. 24, 100 bds. or more	\$4.70
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	\$4.50

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb.

All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

CHATTANOOGA

Base per Lb.

Mild steel bars	3.96c.
Iron bars	3.96c.
Reinforcing bars	3.96c.
Structural shapes	4.01c.
Plates	4.01c.
Hot-rolled sheets No. 10	3.91c.
Hot-rolled annealed sheets, No. 24*	4.06c.
Galvanized sheets No. 24*	4.76c.
Steel bands	4.16c.
Cold-finished bars	4.86c.

* Plus mill item extra.

MEMPHIS

Base per Lb.

Mild steel bars	4.31c.
Shapes, bar size	4.31c.
Iron bars	4.31c.
Structural shapes	4.21c.
Plates	4.21c.
Hot-rolled sheets, No. 10	4.26c.
Hot-rolled annealed sheets, No. 24	4.91c.
Galvanized sheets, No. 24	5.66c.
Steel bands	4.56c.
Cold-drawn rounds	4.80c.
Cold-drawn flats, squares, hexagons	6.80c.
Structural rivets	4.35c.
Bolts and nuts, per cent off list	55
Small rivets, per cent off list	60

NEW ORLEANS

Base per Lb.

Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	\$3.30
Bolts and nuts, per cent off list	60

PACIFIC COAST

Base per Lb.

	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	4.05c.	4.30c.	4.25c.
Shapes, standard	4.05c.	4.30c.	4.25c.
Soft steel bars	4.20c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.975c.	2.975c.	3.625c.
Hot-rolled annealed sheets (No. 24)	5.15	5.05c.	5.35c.
Hot-rolled sheets (No. 10)	4.30c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter)	5.85c.	5.55c.	5.90c.
Galv. sheets (No. 22 and heavier)	6.10c.	5.70c.	5.90c.
Cold-finished steel			
Rounds	6.80c.	6.85c.	7.10c.
Squares and hexagons	8.05c.	8.10c.	7.10c.
Flats	8.55c.	8.60c.	8.10c.
Common wire nails—base per keg less carload	\$3.65	\$3.60	\$3.70

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

Per 1000 f.o.b. Works

First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	\$54.00
First quality, New Jersey	56.00
Select, Ohio	49.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	49.00
Second quality, New Jersey	51.00
No. 1, Ohio	46.00
Ground fire clay, per ton	8.00
5 per cent trade discount on fire clay brick, except for New Jersey, quoted at net price.	

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	\$54.00
Chicago District	63.00
Birmingham	54.00
Silica cement per net ton (Eastern)	9.50
5 per cent trade discount on silica brick.	

Chrome Brick

Per Net Ton

Standard f.o.b. Baltimore, Plymouth Meeting and Chester	\$49.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	49.00

Magnesite Brick

Per Net Ton

Standard f.o.b. Baltimore and Chester, Pa.	\$69.00
Chemically bonded, f.o.b. Baltimore	59.00

Grain Magnesite

Per Net Ton

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	43.00
Domestic, f.o.b. Chewelah, Wash.	25.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$25.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	25.00
Delivered Brooklyn	27.27
Delivered Newark or Jersey City	26.39
Delivered Philadelphia	25.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo, Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	24.00
F.o.b. Jackson, Ohio	25.75
Delivered Cincinnati	24.07
F.o.b. Duluth	24.50
F.o.b. Provo, Utah	22.00
Delivered San Francisco, Los Angeles or Seattle	25.00
F.o.b. Birmingham*	20.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	\$25.75
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	24.50
F.o.b. Buffalo	23.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	23.50
Delivered Cincinnati	24.51
Delivered Canton, Ohio	24.76
Delivered Mansfield, Ohio	25.26
F.o.b. Jackson, Ohio	25.50
F.o.b. Birmingham	19.00

Bessemer

F.o.b. Everett, Mass.	\$26.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	26.00
Delivered Boston Switching District	26.50
Delivered Newark or Jersey City	27.39
Delivered Philadelphia	26.76
F.o.b. Buffalo and Erie, Pa., and Duluth	25.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago.	24.50
F.o.b. Birmingham	25.50
Delivered Cincinnati	25.51
Delivered Canton, Ohio	25.76
Delivered Mansfield, Ohio	26.26

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	\$28.50
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Gray Forge

Valley or Pittsburgh furnace	\$23.50
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Charcoal

Lake Superior furnace	\$27.00
Delivered Chicago	30.04

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	\$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	\$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	
Per Gross Ton	
Domestic, 80% (carload)	\$102.50

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	\$33.00
F.o.b. New Orleans	33.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads)	\$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%	\$27.50
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For each additional 0.5% silicon up to 17%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10.00 to 10.50%	\$33.50
10.51 to 11.00%	34.00
11.01 to 11.50%	34.50
11.51 to 12.00%	35.00
12.01 to 12.50%	35.50
12.51 to 13.00%	36.00
13.01 to 13.50%	36.50
13.51 to 14.00%	37.00
14.01 to 14.50%	37.50
14.51 to 15.00%	38.00
15.01 to 15.50%	38.50
15.51 to 16.00%	39.00
16.01 to 16.50%	39.50
16.51 to 17.00%	40.00

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	\$1.70
Ferrotungsten, lots of 5000 lb.	\$1.75
Ferrotungsten, smaller lots	\$1.80
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.50c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del. per lb. contained V	\$2.70 to \$2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	\$2.50
Ferrocobalt, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$142.50
Ferrocobalt, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	\$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	\$45.00
Ton lots or less, per ton	50.00
Silico-manganese, gross ton, delivered.	
3%	101.50
2.50% carbon grade	106.50
2% carbon grade	111.50
1% carbon grade	121.50

Note: Spot prices are \$5 a ton higher except on 75 per cent ferrosilicon on which premium is \$10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton	
Old range, Bessemer, 51.50%	\$5.25
Old range, non-Bessemer, 51.50%	5.10
Mesabi, Bessemer, 51.50%	5.10

Mesabi, non-Bessemer, 51.50%	\$4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal	17.00c.
Iron, low phos., Swedish, average, 68 1/2% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	Nominal
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	45c.
Man., African, Indian, 44-48%	Nominal
Man., African, Indian, 49-51%	Nominal
Man., Brazilian, 46 to 48 1/2%	Nominal

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal	\$22.00 to \$24.00
Tungsten, domestic, scheelite delivered	Nominal
Chrome ore (lump) c.i.f. Atlantic Seaboard, per net ton:	
South African	\$16.00
Rhodesian, 45%	23.00
Rhodesian, 48%	25.00
Turkish, 48-49%	24.50 to \$25.00
Turkish, 45-46%	20.50 to 21.00
Turkish, 44%	19.00
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:	
52%	\$25.50 to \$26.00
50%	24.50
48-49%	24.50 to 25.00

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	\$19.00 to \$20.00
Domestic, barge and rail	19.50 to 21.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	20.00 to 21.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines	35.00

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate	5.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	5.25c.
Del'd Ch'go, No. 3 industrial	4.15c.
Del'd Ch'go, No. 5 industrial	4.00c.
Del'd Cleve'd, No. 3 distillate	5.75c.
Del'd Cleve'd No. 4 industrial	5.75c.
Del'd Cleve'd No. 5 industrial	5.00c.

COKE AND COAL

Per Net Ton

Furnace, f.o.b. Connells-ville, Prompt	\$4.60 to \$4.75
Foundry, f.o.b. Connells-ville, Prompt	5.25 to 6.50
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.85 to 11.30
Foundry, by-product, Philadelphia	10.60
Foundry, by-product, delivered Cleveland	11.00
Foundry, by-product, delivered Cincinnati	10.50
Foundry, by-product, del'd St. Louis industrial district	11.00 to 11.50
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75
Coal	
Mine run steam coal, f.o.b. W. Pa. mines	\$1.50 to \$1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, 1/4-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

FOR *High Quality Steels*

NIAGARA

BRAND

FERRO-ALLOYS

FERRO SILICON
ALL GRADES

FERRO CHROMIUM
HIGH CARBON

FERRO CHROMIUM
LOW CARBON

FERRO MANGANESE
SILICO MANGANESE



PITTSBURGH
METALLURGICAL CO., Inc.



PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

Piel Brothers, Georgia Avenue, Brooklyn, New York, has let general contract to brewery, primarily for storage and distribution. Cost over \$100,000 with equipment. Ely Jacques Kahn, 2 Park Avenue, New York, is architect.

Anaconda Wire & Cable Co., 25 Broadway, New York, has let general contract to B. J. Nelson, Marion, Ind., for one-story addition to plant at Marion, 120 x 450 ft. Cost over \$150,000 with equipment. F. E. Hart is manager at Marion works.

American Can Co., 230 Park Avenue, New York, has let general contract to Lundoff-Bicknell Co., 100 North LaSalle Street, Chicago, for three-story and basement addition to plant at Englewood, Chicago, 275 x 575 ft. Cost close to \$600,000 with equipment.

H. M. Field, Inc., 67 Montgomery Street, New York, canner and packer of food products, has leased six-story and basement building at 88 Sanford Street, Brooklyn, about 50,000 sq. ft. floor space, for new factory branch, storage and distributing plant, operating in conjunction with three main plants of company in New York State, Pennsylvania and Maryland.

Universal Atlas Cement Co., Hudson, N. Y., has let contract to Spencer, White & Prentiss, Inc., 10 East Fortieth Street, New York, for one-story addition for storage and distribution. Cost over \$175,000 with equipment. Main offices of company are at Chicago.

International Paper Co., 220 East Forty-second Street, New York, has plans for expansion and improvements in sulphite pulp mill at Gatineau, Que., operated in name of Canadian International Paper Co., including new units and installation of machinery. Cost close to \$1,000,000 with equipment.

Ordnance Officer, Second Corps Area, Governors Island, New York, asks bids until June 14 for master tool sets, including wrenches, punches, screw-drivers, sockets, etc. (Circular 3).

Habirshaw Cable & Wire Corp., Yonkers, N. Y., has let general contract to Austin Co., Cleveland, for one-story addition to double capacity of insulated power cable manufacturing department. Cost over \$350,000 with machinery. Stone & Webster Engineering Corp., 49 Federal Street, Boston, is engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 15 for rough machined steel forgings (Schedule 882); until June 18, oil burners, root valves and branch supply pipes and spare parts (Schedule 897) for Brooklyn Navy Yard.

Coca-Cola Bottling Co., Inc., 431 East 165th Street, New York, has let general contract to J. H. Fogarty, North Road, Kingston, N. Y., for one-story mechanical bottling plant at Newburgh, N. Y., including service and garage unit for company motor trucks and cars. Cost close to \$75,000 with equipment. W. H. and J. F. Dusenbury, 10 East Fortieth Street, New York, are architects and engineers.

United States Engineer Office, First District, New York, asks bids until June 15 for castings and parts for dredges, including propeller, liners, pipe steel castings, ball and socket joints, manholes, etc. (Circular 282).

Hind Steel Co., Inc., 2146 Stanley Terrace, Unionville, Union Township, N. J., manufacturer of steel specialties, has plans for one-story addition. Cost close to \$40,000 with equipment. Frederick & Elsasser, 1000 Stuyvesant Avenue, are architects.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until June 14 for converting approximately 16,500 lb. aluminum turnings and scrap into aluminum alloy rods (Circular 841); until June 21, one 1500-kw. condensing steam turbine alternator (Circular 833).

Supply Officer, Naval Aircraft Factory, Navy Yard, Philadelphia, asks bids until June 14 for about 23,000 corrosion-resisting steel wire cable thimbles (Aero Req. 534), aluminum alloy nuts, connectors, couplings, fittings, lock nuts, aluminum collars, etc. (Aero Req. 524); until June 16, four sets tube beading tools (Aero Req. 502-1427); until June 21, 35 sets of flaring tools (Aero Req. 534).

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until June 14 for one pot hardening furnace (Circular 737), one heat-treating oven furnace (Circular 739), one furnace for tempering steel parts (Circular 740); until June 15, 38,850 annealed 70/30 cartridge brass disks for 5-in. navy cartridge (Circular 746).

◀ BUFFALO DISTRICT ▶

Rochester Distilling Co., 926 Exchange Street, Rochester, N. Y., has let general contract to Stewart & Bennett, Inc., 126 North Water Street, for remodeling buildings formerly used as an oil refinery, to be converted for a distilling plant. Cost close to \$75,000 with equipment.

Public Works Department, City Hall, Buffalo, George J. Summers, commissioner, has plans for new hangar, 140 x 200 ft., with repair and reconditioning facilities, at municipal airport. Cost about \$125,000 with equipment. Work will be carried out in connection with erection of other buildings and improvements in airport, entire project to cost about \$1,300,000.

Harrison Radiator Corp., Lockport, N. Y., has asked bids on general contract for main one-story unit, 356 x 520 ft., and one-story adjoining structure, 40 x 240 ft., for office and operating service, for new plant near Lockport city limits. New plant will manufacture heating specialties, including car heaters, car exchangers, thermostats, etc. Cost about \$500,000 with machinery. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer. Company is a division of General Motors Corp.

◀ WASHINGTON DIST. ▶

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until June 14 for 54 pneumatic hammers and 12 pneumatic riveting hammers (Proposal 398-191); until June 17, boring bars, connecting rod aligners, electric reamer driver, grinders, automobile truck engine stands, valve refacers, boring machines, piston heaters, truck clutch rebuilders (Proposal 398-187), 56 wheel indicator alignments, six chamber and caster correction tools complete with hydraulic jack (Proposal 398-188); until June 18, twist drills, screw extractors and lathe dogs (Proposal 398-180), 20 ring gear riveting attachments for hydraulic press, 30 60-ton hydraulic presses with rack and pinion attachment, and two 15-ton crankshaft presses, straightening, screw type, with testing V-blocks, centers and dial test indicator with bracket (Proposal 398-189); until June 19, 38 motor-driven engine lathes (Proposal 398-186).

Mutual Chemical Co. of America, Inc., Block and Willis Streets, Baltimore, has let general contract to Davis Construction Co., 9 West Chase Street, for two-story addition, 55 x 77 ft. Cost close to \$45,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for crane-dredge and diesel-electric generating equipment for installation on pontoon at Navy Yard, Pearl Harbor, T. H. (Specifications 8491); bids (no closing date stated) for boiler plant equipment for power house at hospital, Naval Academy, Annapolis, Md., including 125-hp. self-contained, coal-burning boilers, hand-operated grates, deaerating feedwater

heater, boiler feed pumps, water storage tank, booster pumping units, etc. (Specifications 8402).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 15 for one cupola blower (Schedule 896) for Washington yard; until June 18, one motor-driven turret lathe (Schedule 901), three 15-in., motor-driven, portable disk sanders (Schedule 903), electric air heaters and spare parts (Schedule 890); until June 22, turbo-generator sets, switches and accessories (Schedule 751) for Eastern and Western yards; one diesel engine-electric propelling plant and spare parts (Schedule 864) for Boston yard; until June 18, aluminum alloy aircraft propellers and propeller hubs (Schedule 909) for Buffalo Station; pressure-reducing air valves (Schedule 912) for Portsmouth and Mare Island yards.

◀ NEW ENGLAND ▶

Readville Distilleries, Inc., Readville, Mass., has let general contract to Rudnick Co., 40 Sprague Street, for one-story addition, 100 x 325 ft., primarily for storage and distribution. Cost over \$150,000 with equipment.

Amoskeag Machine Co., Manchester, N. H., Alfred H. Vose, president and general manager, recently organized to manufacture textile machinery, parts and other machined products, has purchased from Amoskeag Industries, Inc., former machine shops of Amoskeag Mfg. Co., manufacturer of textiles, comprising one and two-story building, totaling 118,800 sq. ft. floor space. New owner will make improvements and will begin production soon, providing facilities for employment of about 250 persons for initial operations.

Rice, Barton & Fales, Inc., Taintor Street, Worcester, Mass., manufacturer of machinery and parts for paper and textile mills, has let general contract to E. J. Cross Co., 82 Foster Street, for one-story addition for expansion in machine shops. Cost close to \$30,000 with equipment.

North Shore Cutting Die Co., 898 Broad Street, Lynn, Mass., manufacturer of dies and kindred products, has asked bids on general contract for one-story addition, 50 x 75 ft. Cost about \$40,000 with equipment. M. F. Coombs, 56 Central Avenue, is architect.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until June 14 for one hardness tester and one superficial hardness tester (Circular 267), seven vertical drill presses (Circular 275), one 6-in. vertical, motor-driven shaper and equipment (Circular 273), one motor-driven continuous motion filing machine and extra chains (Circular 270); until June 15, one chaser and tool grinder (Circular 283); until June 17, one semi-automatic gun barrel multi-tool turning lathe (Circular 295).

◀ SOUTH ATLANTIC ▶

Brooks Foundry & Machine Co., Marietta Street, N.W., Atlanta, Ga., manufacturer of gray iron castings, etc., has let general contract to Hardin & Ramsey, 161 Spring Street, N.W., for one-story top addition to present single story plant. Cost about \$30,000 with equipment.

Contracting Officer, Quartermaster Corps, Fort Benning, Ga., asks bids until June 15 for cast iron pipe fittings, cast iron floor flanges, valves, 20 40-gal. tanks, grate bars, boiler-fire pots and other equipment (Proposal 148-135).

Board of Utilities Commissioners, Orlando, Fla., asks bids until June 21 for extensions and improvements in municipal electric power plant, including one 10,000-kw. turbo-generator unit with accessories, one 1500-hp. boiler and auxiliary equipment; also for 175-ft. stack. Entire project will cost over \$600,000. Robert & Co., Bona Allen Building, Atlanta, Ga., are consulting engineers.

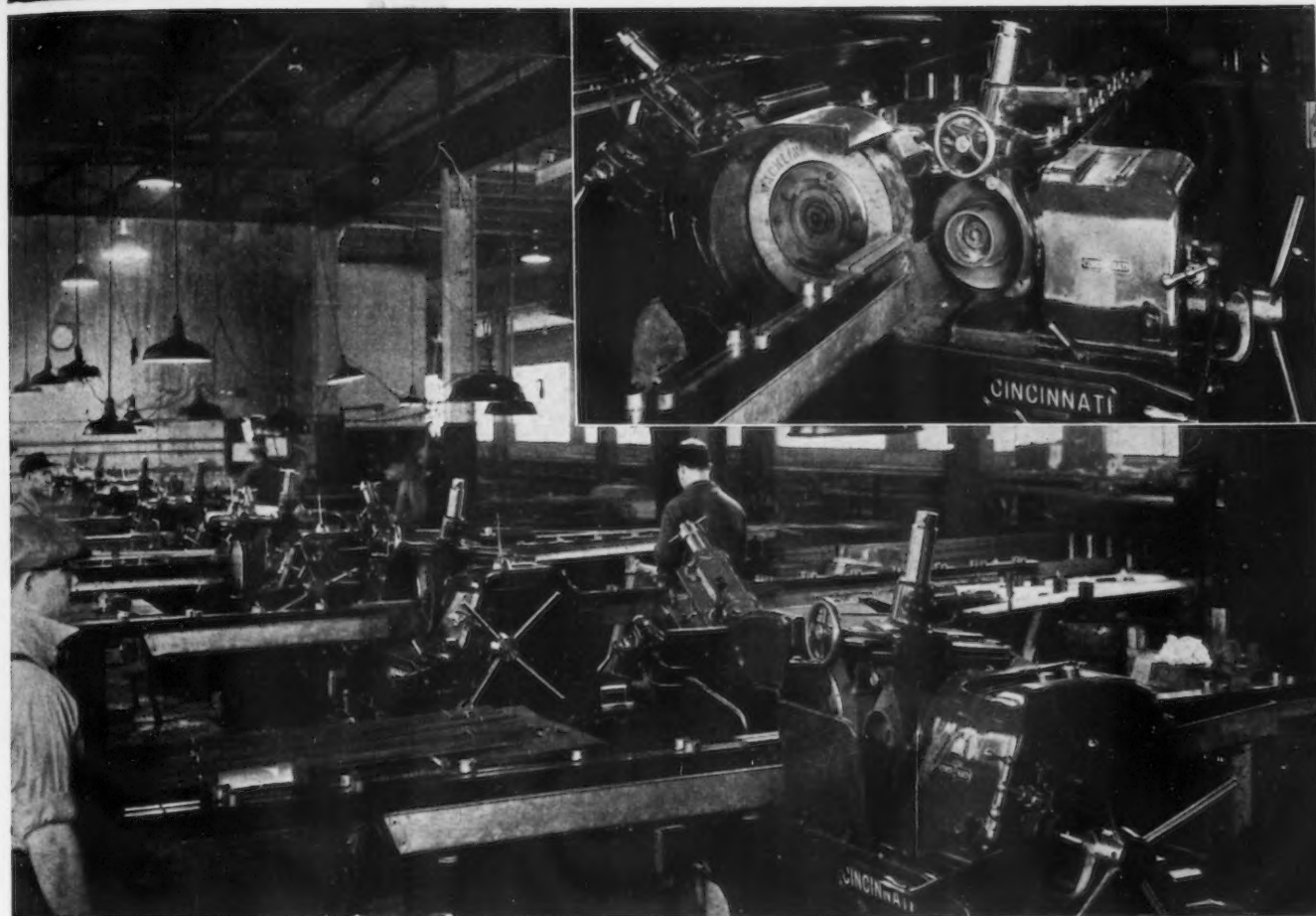
◀ SOUTH CENTRAL ▶

Bourbon Distilling Co., Paris, Ky., Daniel E. Fowler, 408 Citizens' Bank Building, Lexington, Ky., representative, recently organized by Mr. Fowler and associates, plans new distillery on Ford Mill Pike, Paris, where site has been acquired. Cost close to \$100,000 with equipment.

United States Engineer Office, Vicksburg, Miss., asks bids until June 14 for steel castings, including two spud well castings, cast steel bulkhead, suction pipe hull fit-

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Macklin Grinding Wheels are being used for all types of centerless grinding. They give . . . Long Life . . . Exacting Limits . . . Quality Finish . . . resulting in economical and efficient grinding. Macklin Wheels will "Protect Your Production" on all kinds of grinding operations.

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tings, cast steel ladder trunnions, cast steel sea chests, etc. (Circular 280).

Liberty Engineering & Mfg. Co., Inc., 325 Roland Street, Louisville, manufacturer of machinery and parts, has let general contract to Austin Co., Cleveland, for one-story plant unit, 110 x 120 ft. Cost over \$60,000 with equipment.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until June 17 for steel switch structures for Pickwick Landing dam generating station.

Walker Brothers & W. P. Hatchett, Harrodsburg, Ky., distillers, have acquired tract on Factory Street for new distillery, comprising several one and multi-story units. Cost close to \$125,000 with equipment.

◀ SOUTHWEST ▶

Foster Brothers Mfg. Co., 3230 North Broadway, St. Louis, manufacturer of metal bedsteads, springs, etc., has let general contract to Construction Service Co., 105 North Seventh Street, for one-story addition to plant on Buchanan Street, 40 x 100 ft. Cost close to \$50,000 with equipment. Main offices of company are at Utica, N. Y.

Contracting Officer, Quartermaster Corps, Fort Riley, Kan., asks bids until June 18 for one combination universal brake-testing and wheel aligning machine, complete with stand-type gage panel (Proposal 735-77).

Key Co., McCasland Avenue, East St. Louis, Ill., manufacturer of boiler plant equipment, oil refinery equipment, etc., has asked bids on general contract for one-story foundry, about 90,000 sq. ft. floor space. Cost over \$150,000 with equipment. O. D. Conover, 1740 East Twelfth Street, Cleveland, is engineer.

Smith & Brothers Refinery Co., Inc., McLean, Tex., recently organized to take over Smith Brothers Refining Co., plans expansion and improvements in gasoline refinery, including additional equipment. Company has arranged financing to total about \$1,500,000, part of fund to be used for purpose noted.

Pittsburgh Valve & Fittings Co., Commerce Street, Houston, Tex., manufacturer of engineering specialties, will take bids soon for one-story addition, 72 x 100 ft. Cost about \$45,000 with equipment. Joseph Finger, Inc., National Standard Building, is architect.

Southwest Pump Co., Bonham, Tex., has acquired tract adjoining plant and will use part of property for one-story addition. Cost over \$50,000 with equipment. Eugene Risser, Sr., is president.

Shamrock Oil & Gas Co., Dumas, Tex., plans rebuilding part of McKee oil refining plant recently destroyed by fire. Loss close to \$100,000 with equipment.

◀ WESTERN PA. DIST. ▶

Mayer Body Corp., 204 Auburn Street, Pittsburgh, manufacturer of steel automobile bodies, has let general contract to A. F. Gailey, 6467 Frankstown Avenue, for one and two-story addition. Cost over \$50,000 with equipment. George O. Rogers, B. F. Jones Law Building, is architect.

Duquesne Light Co., 435 Sixth Avenue, Pittsburgh, has plans for expansion and improvements in steam-electric generating plant, including new 60,000-kw. turbo-generator unit and auxiliary equipment. Cost over \$1,000,000.

Chase Brass Co., 855 North Avenue West, Pittsburgh, has let general contract to B. A. Groah Construction Co., 847 West North Avenue, for two and three-story addition, primarily for storage and distribution. Cost over \$75,000 with equipment. Main offices of company are at Waterbury, Conn.

◀ OHIO AND INDIANA ▶

Ohio Crankshaft Co., 6600 Clement Avenue, Cleveland, has let general contract to Sam W. Emerson Co., 1836 Euclid Avenue, for new one-story plant, 150 x 500 ft. Cost close to \$250,000 with machinery. Wilbur Watson & Associates, 4614 Prospect Avenue, are architects and engineers.

Lincoln Electric Co., 12818 Coit Road, N.E., Cleveland, manufacturer of motors and parts, welding apparatus and kindred electric equipment, has taken title to 10-acre tract adjoining present plant, and will have plans drawn soon for new units.

Jaeger Machine Co., Michigan Avenue, Columbus, Ohio, manufacturer of contractors' machinery and parts, has let general contract to T. J. Schirtzinger, 1383 Lincoln Road, for one-story addition, 40 x 80

ft., primarily for storage and distribution. Cost close to \$30,000 with equipment.

Champion Paper & Fibre Co., Hamilton, Ohio, has authorized plans for addition to branch mill recently completed on Houston ship channel, Pasadena, Tex., for sulphate pulp production. Cost about \$1,500,000 with machinery. J. E. Sirrine & Co., Greenville, S. C., are consulting engineers.

Tappan Stove Co., Wayne Street, Mansfield, Ohio, has plans for one-story addition, 70 x 180 ft. Cost about \$70,000 with equipment. C. W. Conklin, 20 Dawson Avenue, is architect.

Contracting Officer, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until June 17 for 354 wheel and brake assemblies (Circular 822), for 328 electric inertia starter assemblies (Circular 820).

Steel Improvement & Forge Co., 960 Addison Road, Cleveland, manufacturer of drop forgings, has let general contract to J. L. Hunting Co., Chester-Ninth Building, for one-story addition. Cost close to \$30,000 with equipment. Edward G. Hoefler, 5005 Euclid Avenue, is architect and engineer.

Purchasing and Contracting Officer, Quartermaster Corps, Fort Benjamin, Harrison, Ind., asks bids until June 14 for lock-nuts, steel conduit, wire, switches, galvanized wire cloth, screws and other equipment (Proposal 384-52).

◀ MICHIGAN DISTRICT ▶

Koestlin Tool & Die Corp., 3601 Humboldt Street, Detroit, manufacturer of steel dies for automobile bodies and other products, tools, etc., has plans for one-story addition, 60 x 200 ft., superstructure to begin this summer. Cost over \$80,000 with equipment.

Fisher Body Division, General Motors Corp., Detroit, has approved plans for one-story addition to No. 1 plant at Flint, Mich., totaling about 170,000 sq. ft. floor space, for expansion in press room and die shop. Cost over \$650,000 with machinery.

Plymouth Motor Corp., 10060 Mount Elliott Avenue, Detroit, a division of Chrysler Corp., Detroit, has asked bids on general contract for one-story machine shop. Cost over \$85,000 with equipment. Albert Kahn, Inc., New Center Building, is architect and engineer.

Steel Materials Corp., 17260 Gable Street, Detroit, organized recently to take over Metal Materials Co., manufacturer of steel stampings and other steel products, plans expansion and improvements, including one-story additions and installation of machinery. Company has arranged financing totaling about \$325,000, a considerable part of proceeds to be used for purpose noted.

L. A. Young Spring & Wire Corp., 9200 Russell Street, Detroit, has let general contract to O. W. Burke Co., Fisher Building, for four-story addition. Cost close to \$100,000 with equipment.

Consumers Power Co., Jackson, Mich., plans new service building and shop for electrical and mechanical divisions at Bay City, Mich., including garage for company motor trucks and cars. Cost over \$100,000 with equipment.

◀ MIDDLE WEST ▶

Diamond T Motor Car Co., 4517 West Twenty-sixth Street, Chicago, has acquired about 17-acre tract adjoining plant and will use portion of site for additions. Plans are under way for one-story structure for storage and distribution. Cost about \$150,000 with equipment.

John Deere Spreader Works, Inc., Eleventh Street and Thirteenth Avenue, East Moline, Ill., manufacturer of agricultural equipment, affiliated with Deere & Co., same place, has let contract to Jens Oleson & Sons Construction Co., Waterloo, Iowa, for three one-story additions, with main unit, 72 x 260 ft., for foundry, and two smaller structures for core building and service unit respectively. Cost over \$100,000 with equipment. A. O. Eckerman, 1725 Third Avenue, Moline, Ill., is company architect.

National Cylinder Gas Co., 205 West Wacker Drive, Chicago, manufacturer of industrial oxygen, acetylene gas and other industrial gases, has purchased 11-acre tract at Dallas, Tex., for new branch plant, consisting of several one and multi-story units, with power house and machine shop. Cost about \$100,000 with equipment. Company has arranged for sale of 120,000 shares of stock, part of proceeds to be used for purpose noted.

Town Council, Lake Mills, Iowa, asks bids until June 21 for diesel engine-generator unit of 500-bhp., with auxiliary equipment, two cooling water pumps, air filter, panelboards and other equipment for municipal electric power plant. L. L. Waggoner is superintendent of plant.

Quartermaster, Scott Field, Ill., asks bids until June 15 for three fire box-type steam boilers (Proposal 824-53).

Northern Electric Co., 5200 North Kedzie Avenue, Chicago, manufacturer of domestic electrical appliances and equipment, has plans for one-story plant unit, 62 x 125 ft., for which bids will be asked soon on general contract. Cost over \$60,000 with equipment. Alfred A. Nelson & Son, 2432 Irving Park Boulevard, are architects.

Quad-City Coca-Cola Co., 2119 Third Avenue, Rock Island, Ill., plans new one and two-story mechanical-bottling plant, 140 x 140 ft., for which bids will be asked soon on general contract. Cost close to \$75,000 with equipment. R. C. Sandberg, Rock Island Bank Building, is architect. E. H. Gates is president and manager.

Charles A. Krause Milling Co., North Forty-third and West Burnham Streets, Milwaukee, plans new corn milling and processing plant costing about \$1,250,000 to supplant mill wrecked by grain dust explosion and fire April 10. New plant will require practically all new machinery, motors, conveyers, etc.

Milwaukee Flush Valve Co., 301 East Reservoir Avenue, Milwaukee, manufacturer of sanitary specialties, has placed general contract with Siesel Construction Co., 514 East Ogden Avenue, for new factory unit, 41 x 65 ft., two stories and basement, costing about \$40,000 with equipment, to replace shop badly damaged by fire recently.

Jefferson, Wis., County Board, Elton G. Rice, clerk, will take bids about June 21 for county highway commission garage, warehouse, service and machine shop, 80 x 160 ft., one and one-half stories, costing about \$50,000 with equipment. Robert Stengel, local architect, is in charge.

Milwaukee Western Malting Co., 313 South Water Street, Milwaukee, has placed general contract with Klug & Smith Co., 111 East Wisconsin Avenue, for malt house addition, 100 x 111 ft., three stories and basement, and replacement of three grain elevators, 100 x 206 ft., 126 ft. high, at cost of \$500,000, including complete equipment.

◀ PACIFIC COAST ▶

Pacific Wire Products Co., 1955 East Sixteenth Street, Los Angeles, has let general contract to Latisteel Corp., 3110 East Foothill Boulevard, Pasadena, Cal., for new one-story plant at Compton, Cal., totaling about 25,000 sq. ft. floor space. Cost over \$60,000 with equipment.

Byron Jackson Co., Carlton and Sixth Streets, Berkeley, Cal., manufacturer of oil well equipment and supplies, pumping machinery and parts, has purchased about six-acre tract on Navigation Street, Houston, Tex., for new branch plant. Erection will be in charge of Samuel D. Cook, Second National Bank Building, Houston. Cost over \$400,000 with equipment.

Bureau of Reclamation, Custom House, Denver, asks bids until June 18 for pipe lines, storage tank and auxiliary equipment systems for Imperial Dam and desilting works, All-American Canal System, Boulder Canyon Project (Specifications 932-D).

California Packing Corp., 101 California Street, San Francisco, cannery and packer of food products, has let general contract to Austin Co., Seattle, for two additions to branch plant at Toppenish, Wash., each one-story, 75 x 200 ft., and 80 x 200 ft., respectively, for expansion in canning division, and for storage and distribution. Cost over \$80,000 with equipment.

California Wire Cloth Co., 1001 Twenty-second Avenue, Oakland, Cal., with branch plant at South San Francisco, has been acquired by Colorado Fuel & Iron Co., Denver, which will operate as an affiliated interest. A subsidiary is being organized to take over property. Plans are under way for expansion and improvements in plants, including additional equipment, to cost over \$200,000.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 18 for spare parts for airplanes (Schedule 900-886) for San Diego Naval Air Station; until June 22, copper-nickel alloy tubing (Schedule 899), molybdenum alloy steel tubing (Schedule 900) for Mare Island yard.